The Veterinary Record.

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

NO. 20. MAY 16, 1931. VOL. 18.

The Correlation Between Infectious Abortion of Cattle and Undulant Fever of Man.

By Lt. E. W. Bevan, M.R.C.V.S.
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In the *Veterinary Record* of January 17th, 1931, is reproduced an article from the *American Journal of Nursing*, Vol. xxx, No. 11, 1930, in which Alice C. Evans describes how, in 1917, she discovered the resemblance between the causal organisms of Malta fever of man and contagious abortion of cattle. She writes: "It was a great surprise to me to find that Bruce's micrococcus and Bang's bacillus are so nearly alike that ordinary laboratory tests cannot differentiate them, although, as further study revealed, they can be differentiated by the intricate agglutinin absorption test. Why then, did we not have undulant fever in this country? It was five years before that question was answered; we do have it. In 1922 a case of undulant fever caused by the *abortus* type of the organism was recognised in the Johns Hopkins Hospital in Baltimore. It was the first proved human case of *abortus* infection ever to be reported in the world's literature on undulant fever. Soon afterwards a report came from South Africa, followed by reports from various far corners of the world, stating that undulant fever is contracted from cattle."

Although the Baltimore case was not known in Rhodesia until the publication of Keefer's report in 1924, the practical importance of Miss Evans' discovery was immediately recognised in this country, where mysterious cases were occurring in which the symptoms of Malta fever were present. In these no association with goats could be traced, but a connection with outbreaks of bovine abortion was generally forthcoming. Thus, on November 12th, 1921, in a paper entitled "Infectious Abortion of cattle and its possible relation to human health" read before the Southern Rhodesia Veterinary Association and subsequently published (January 19th, 1922) in the *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 15, 215-231, the writer described how, in February of that year, "a patient from the Shamva District was admitted to the Salisbury Hospital, and his serum was obtained by Dr. Peall and tested by Bevan against cultures of *B. abortus* with which it caused rapid and marked agglutination in dilutions of one in 200. This, I believe, was the first demonstration of a co-relation between the abortion of cattle and undulant fever of man in this country. The test was prompted by an article by Feusier and Meyer, in which they showed by serological tests a close association between *B. abortus* and *M. melitensis*, and pointed out that certain strains of *M. melitensis* bore a closer relationship to the abortion bacillus than to other strains of melitensis. They also demonstrated that the serum from cows and hogs suffering from natural abortion disease may also react to both *B. abortus* and *B. melitensis* organisms."

I also stated that "recent observations by Orpen, working in the laboratory of the Medical Department, and by Bevan, working independently, reveal a very serious state of affairs in this country, if serological tests and cross-agglutination reactions are to be regarded as indicating any corresponding pathogenicity of the organisms."

The following conclusions appeared at the end of the paper referred to:—

"1. The disease known as infectious abortion of cattle, which exists in S. Rhodesia, is caused by the *B. abortus* of Bang, and serological tests indicate that it is identical wth the specific abortion of cattle in other parts of the world."

"2. The *B. abortus* of Bang bears a close morphological and biological resemblance to the *M. melitensis*. Serological tests also indicate a close affinity, in that certain strains of *M. melitensis* can be agglutinated with serum from cattle infected with infectious abortion, and strains of *B. abortus* can be agglutinated by serum from human patients suffering from undulant fever."

"3. The characteristic symptom of undulant fever in goats and sheep is abortion."

"4. Certain cases presenting symptoms resembling undulant fever have occurred in Southern Rhodesia in men, who, as far as is known, have not obtained infection from goats, but have resided on farms where animals are or have been infected with infectious abortion."

"5. It is suggested that these cases are suffering from an infection caused by the *B. abortus* of cattle."

"6. It is also suggested that human females may contract infectious abortion through the ingestion of the organism in milk and dairy products from infected cows."

"7. Although infectious abortion is prevalent in other parts of the world where goat's milk is not used for human consumption, it has not been accused of causing the symptoms of undulant fever in man, nor has it been proved to cause abortion in human subjects."

"8. Although infectious abortion has prevailed in the Marandellas District for many years, it is only within the last few months that cases resembling undulant fever in man have been recorded."

"9. While circumstantial evidence points to the infection of many by the *B. abortus* of Bang, and scientific tests up to a point support this suspicion, the final proof is not yet available."

"10. If infectious abortion of cattle is essentially a bovine disease, a grave responsibility attaches to the Veterinary Department; and if this disease is communicable to man, a hearty co-operation between the medical and veterinary profession is necessary in dealing with it."

As stated above, the position revealed proved to be a very serious one. In 1921 the serum of 14 cases of undulant fever was tested by Orpen at the Public Health Laboratory. The first five were tested only against suspensions of *M. melitensis*, but all proved positive. Later in the year the test was made against *M. melitensis*, a strain of *B. abortus* numbered 1,151 supplied by the South African Institute of Medical Research, Johannesburg, and a strain supplied by the writer. The last six cases yielded positive results to all three. In 1922 the sera from 22 cases were similarly tested and of these 15 proved positive to the three strains, and two others to two strains. In 1923

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14 cases were tested with positive results against *M. melintensis* and a human strain known as *Br. abortus* (Lockey) and in 1924 18 cases. No detailed record is available to the writer of cases tested thereafter, but they were numerous, and continued so until the past year when the numbers decreased. Many more cases of undulant fever were diagnosed by medical practitioners from their clinical manifestations as distinct from serological tests, and as far as is known to the writer none of them could be attributed to infection from goats, although, as previously stated, many of them could be definitely associated with outbreaks of bovine abortion. It was in 1922 that Orpen obtained the first culture of an organism undistinguishable from *B. abortus*, from a human subject suffering from "Rhodesian Undulant Fever." This was the strain previously referred to as *Br. abortus* (Lockey). In 1923 this organism, with three other strains from Rhodesian human cases, were tested by him by means of prepared sera and absorption tests, and were found to be identical with each other and with a strain of *Br. abortus* from the Government Veterinary Laboratory, Onderstepoort, with a strain supplied by Bevan, but to differ serologically from two strains of *B. melitensis* and one strain of Para-melitensis supplied by the Lister Institute, London. These results were published (*a*) in the Public Health Annual Report for the year 1922; (*b*) in the *South African Medical Record* in 1924 and (*c*) In the *Transactions of the Royal Society of Tropical Medicine and Hygiene*, xvii, February 21st, 1924.

All the work had been performed before the publication of Keefer's Report referred to in Alice Evans' Report on "Malta Fever" issued by the United States Public Health Service in March, 1924, in which she contends that the Baltimore case furnished conclusive proof whereas all preceding evidence was "entirely presumptive." It was apparently the application of the absorption test by her, which rendered the proof conclusive, so that it is interesting to note that Orpen in this country had been adopting this method as early as 1923.

The investigations subsequently carried out by G. R. Ross, Rhodesian Research Fellow of the London School of Hygiene and Tropical Medicine, and published in *The Journal of Hygiene*, vol. xxvi, No. 4, October 18th, 1927, are of considerable interest by reason of the fact that serological tests of 8 strains of *Brucella* isolated from patients suffering from undulant fever in Southern Rhodesia showed that six were serologically identical with the type *Br. abortus* and two (one of which was the "Lockey" strain) were identical with what he regarded as a *Br. para-abortus*. As one strain of *Br. abortus* and the *para-abortus* strains originated from cultures obtained from infected cows by Sheather, of the Royal Veterinary College, London, the results indicate that the Rhodesian undulant feyer of man and the bovine abortion of Great Britain are related. On the other hand, the relative incidence of the human cases of abortus infection in the two countries suggests a "distinction with a difference," for whereas in Southern Rhodesia, with a population of less than 45,000 Europeans, more than two hundred cases have been diagnosed by serological methods during the past ten years, in Great Britain with a population of 45 millions, and where bovine abortion is even more prevalent, only 34 cases of human infection have been recognised during the same period.

Ross, in his paper previously referred to, states: "It is occasionally found that strains develop the property of agglutinating spontaneously, or in the presence of normal serum. Izar (1926) notes that after cultivation on glucose-glycerine agar a strain of *Br. melitensis* became readily agglutinable with normal as well as pathological sera. This finding has been corroborated by Bevan (personal communication) and during the course of the present investigation. It was found, however, that repeated subculture in broth and subsequently upon Torrey-Buckell hormone agar restored specificity to the agglutinin reaction." Again, in our own experience at the Veterinary Research Laboratory, Salisbury, the frequent subcultivation of *Br. abortus* in liquid media, for vaccine production, eventually deprived the organisms of the power of agglutinating in the presence of known positive sera.

It is probable therefore, that the peculiar incidence of the diseases constitutes more reliable evidence of a correlation between them than the vagaries of the absorption test.

Studies in Brucella Melitensis (Abortus) Infection of Cattle.

In the course of an article published in the *Cornell Veterinarian* (vol. xxi, No. 1, January 1st, 1931), Chas. A. Mitchell and F. A. Humphreys, of the Animal Diseases Research Institute, Department of Agriculture, Ottawa, Canada, say:—

"Among the interesting factors connected with infection of cattle by the *Brucella melitensis (abortus)* is the frequent colonisation of the organism in the udder of infected animals. Smith and Fabyan and Schroeder were the first to direct attention to the presence of the organism in the milk. For a number of years no emphasis was placed on udder infection, but during that time considerable investigational work was directed towards the uterine and placental pathology. Evans, in her study of market milk, demonstrated the frequent presence of the organism in ordinary commercial raw milk. Cooledge, in attempting to develop a technique for the examination of a large number of samples without culturing or inoculating guinea-pigs, examined by agglutination the whey from milk samples, finding antibodies present. He demonstrated that if a pure culture of Bang's bacillus were introduced into the udder it caused the appearance of agglutinins in the milk. Smith, Orcutt and Little showed the participation of the udder tissue in the production of the agglutinins. Cooledge and Tweed both found that there was a relationship between the high cellular count of milk and the invasion of the organ by Bang's bacillus. Fitch studied the blood and milk from 48 animals and found organisms in the udder of 29·1 per cent., the agglutination titre of every animal showing a positive milk was at least 1 : 100. Runnells and Huddleson studied udder infections in three animals and found microscopic evidence of progressive changes that presented a picture of chronic lymphadenitis. Gilman studied milk from all quarters of 34 cattle and as a result tentatively assumed that quarters showing agglutinins of 1 : 80 or above are infected with Bang's bacillus and may eliminate the organism at any time; others showing agglutinins lower than 1 : 80 only in rare instances contain or eliminate the organism.

"Following the discovery that the *Br. melitensis (abortus)*, was pathogenic for man, the question of udder

infection of cattle assumed increased importance. Not only has this been of paramount interest from a preventative medicine standpoint, but it may have considerable bearing on control measures directed against the bovine infection.

"The early experiments of Schroeder and Cotton established that the organism was but a temporary inhabitant of the uterus, that is, it might be present during gestation but following delivery it could be found in the uterus for but a few weeks. This finding has been amply verified since. The organism has been found in the udder in varying percentages of reacting animals by the many workers that have studied the subject. Mitchell and Duthie have shown that the removal of the udder from two high titred reacting animals was followed by a decline of agglutinin titre. All this points to the possibility of the udder being the principal locum of infection and the seat from which are excreted continuously many micro-organisms. In fact, the milk is probably most to be feared as a medium for the transference of infection from animal to animal as well as from animal to man.

"A test that would demonstrate the animals with infected udders, and therefore the animals continuously excreting numerous organisms, would probably be of definite assistance in controlling the bovine infection, since it is not impossible that a reacting animal with a non-infected udder is a source of little danger except, of course, when an actual abortion takes place.

"We, therefore, attempted to study by means of the various serological tests the milk taken from each quarter of animals in a reacting herd, and to correlate these findings with an investigation regarding the presence of live *Br. melitensis* (*abortus*) organisms in the quarters to which reference has been made. If the results of the tests and the animal inoculations paralleled, we felt justified in conducting field experiments attempting to modify methods of control by giving more freedom to those reacting animals that show no evidence of udder infection; and persons familiar with regulatory measures know that an advance along this line would be of considerable assistance to the many live stock owners, who are at present unable to carry out the two unit plan.

"The animals chosen for experiment were taken from a herd which some years previously had passed through a so-called "abortion storm." The acute infection had apparently subsided and for a number of years relatively few abortions had occurred in the herd. Frequent serological examinations indicated that as the young animals matured a large percentage became infected. Several years ago it was decided to eliminate infection by the double unit plan and as a consequence the herd was divided into reacting and non-reacting units. The number of animals in the reacting unit was reduced from time to time until 17 animals are now left. Our study was made upon 16 of these animals."

Details of the method used in preparing milk for examination and in determining the presence of the organism in the quarter are given, with tables of blood and milk reactions and infectivity for guinea-pigs.

The authors proceed: "It is difficult to determine the presence of a mild infection in a quarter, since in these cases organisms may only be given off periodically. Obviously it is impracticable to examine the milk daily. In cases where guinea-pig inoculations proved negative, if it were practicable to carry the examination over the entire milking period, the result might be different from the findings recorded. We, therefore, consider a positive guinea-pig test as evidence of infection in the quarter, but the failure to infect a guinea-pig is not considered as conclusive proof that infection does not exist.

"A study of the tabulated information indicates that there is a general agreement between the presence of agglutinins and the presence of infection. In no case where infection was absent from the milk, and in no case where infection was proved, were both agglutinins and complement fixing bodies absent from the milk, and in no case where both these antibodies were absent from the milk was infection found. It would, therefore, seem that the absence of both agglutinins and complement fixing bodies is fairly reliable evidence of the absence of infection.

"It will also be noted that the agglutination and the complement fixation tests were not always in agreement. In our diagnostic routine tests both the agglutination and complement fixation tests are employed because of such cases. While admittedly this greatly increases the work, still we are convinced, after an experience of several years, during which a great number of tests have been conducted, that the increased labour is repaid. More especially is this true in herds where infection has existed for many years and where many chronic cases are found.

"It is noteworthy that in many of the guinea-pigs the complement fixing substance was present previous to the agglutinins.

"In studying this herd and attempting from time to time to culture *Brucella melitensis* (*abortus*) organisms from the uterus of recently freshened animals, we have been surprised to find the few cases where organisms have been found except when an abortion took place. Positive reacting animals that went through a normal pregnancy, and were examined soon after parturition, have in all but one instance failed to give us growths of *Br. melitensis* (*abortus*).

"This, taken together with the evident frequency of organisms in the various quarters of the udders in animals of this reacting herd, impresses us with the importance of the milk as a spreader of infection. In fact, in our scheme of control we do not allow the feeding of raw milk, taken from reacting animals, to calves, since the organisms may pass through the intestinal tract of the calf unchanged. We believe that the feeding of unpasteurised milk that evidently is so heavily charged with organisms is a potential means of disseminating infection.

The authors summarise the results of their experiments as follows:—

(1) In a positive reacting herd composed of 16 animals, 12, or 75 per cent. of the animals were proved to excrete the *Brucella melitensis* (*abortus*) from one or more quarters of their udders—two animals had one quarter infected, three animals had two quarters infected, five animals had three quarters infected and two had four quarters infected.

The right front was infected in six instances, the right rear in nine, the left rear in ten, and the left front in six.

(2) In each case the milk from the infected udder reacted to the agglutination or the complement fixation test, usually to both.

Bovine Abortion and Vaccination.

By W. Scott, F.R.C.V.S., Bridgwater.

At a meeting of the Mid-West and South Wales Division, N.V.M.A., held in Bath last year, vaccination as a prophylactic against abortion in cattle was discussed and the conclusions arrived at were exceedingly unsatisfactory, for, if my memory does not fail me, half the members present were in favour and half against the treatment.

When one thinks of it, this is rather strange, for abortion is no new disease, and vaccination has been practised for many years.

Statistics there must be, therefore, in abundance, which only await collecting and assessing.

Has the time not now arrived when we might with advantage gather this necessary information. May I therefore suggest, with this object in view, that the pages of the *Veterinary Record* be made the medium?

To stimulate discussion I should like to make a few observations thereon.

Speaking generally, an animal infected—naturally—with specific abortion acquires in time a fast immunity. To the immunologist this is a valuable fact, for it proves that, if he can emulate natural immunisation by producing a suitable antigen, he, too, may bring about immunity of a lasting character. A natural acquired immunity is usually obtained by the animal ingesting the virus but, as we know, this process is a slow one.

Injecting the *virus* subcutaneously, as advocated by the Ministry of Agriculture, produces immunity in a much shorter time, but this method and its technique is open to many important objections. I understand that this virus is neither standardised as to its potency, nor as to its bacterial content; consequently, uniformity of action cannot be looked for. Further, I believe the dosage is heroic and although I am a believer in giving large doses of antigens in animals, in the unprepared subject I exercise caution, especially with virus.

To clarify my point, let me visualise briefly what takes place—local and focal—following a full dose of virus *subcutis*.

The active germs, following subcutaneous injection, finding a suitable medium for growth, *i.e.*, heat; moisture and nourishment—multiply. The body defensive factors are not idle in checking this growth; local cellular activity is great and in combination with the humoral elements the invaders are attacked. Many body cells and bacteria fall in the sway of battle and are carried away by the blood and lymph stream, carrying with them their toxins and developing antitoxins, raising thereby the immunological index. This is all to the good. There is, however, another side—a debit side. The potency of the change must have, to a certain extent, a local paralysing influence—negative chemo-taxis—upon the defensive mechanism, with the result that many active bacteria break through and migrate into the circulation. As the blood stream does not appear to be a natural habitat for the *Br. abortus*, I question if in this medium their potency would be felt, or that their multiplication would be great. But the power of attraction and selection inherent in all bacteria is not absent in this, and once they find their way into the blood and lymph stream one may be certain that they are not long in reaching their "ancestral" home and, once "housed" in the generative and mammary systems this aggressiveness becomes patent, with consequent sterility. In all fairness, however, it should be pointed out that in many cases the protective response to such potent vaccination is of such an exalted order and the immunological index so high that bacterial aggression is thwarted and the animal is "salted," may be for life. Nevertheless, in practice, the "breakdowns" following *virus* injection, are too numerous to be ignored, and the wrecking in such of the immunising mechanism is a clinical fact, of which practitioners are cognizant.

Of course it is recognised that the virus must only be injected into non-pregnant cows and the field for bacterial "housing" is more limited in a quiescent uterus in consequence, but, as has been pointed out, a pathogenesis sometimes follows which should not be ignored, and we also know that if a *virus* antigen is administered to a pregnant cow it invariably produces such an active invasion that abortion follows, clearly proving, as already stated, that a complete dislocation of the immunising mechanism has followed this heroic injection. I therefore submit that such a procedure is contrary to the rules and tenets of immunology, as we know them.

If a virus must be used, the following axioms should be considered:—

(1) The dose should be standardised.

(2) The animal body should be prepared before it receives the *active virus*, in this case by the injection of a sterile antigen.

(3) All antigens should be polyvalent—no matter what type of vaccine is used.

This last is a very important point and I question if it has received the attention its importance merits. The clinician will bear me out when I say that some outbreaks run a mild and short course while others are virulent from the outset and persistent at that—why? The severity, or otherwise, of an infection is dependent on two primary factors (*a*) the aggressivity of the invading organism; (*b*) the natural or acquired resistance of the host.

In some outbreaks it is conceivable that the bacillus at the outset has a low aggressive power, but as it passes from animal to animal its virulence increases; *per contra*, if the hosts carry a high resistance power the outbreak will run a mild and limited course.

In those cases where the resistance index is low vaccination is indicated.

I have said sufficient without stressing further the fact that the *Br. abortus* appears to be an organism of many strains, and we immunologists know full well that to produce an antigen of high therapeutic value for a given

(3) In each case where agglutinins and complement fixing substances were absent guinea-pig inoculation was negative.

(4) In several instances the milk reacted to both tests but organisms were not demonstrated.

(5) Guinea-pigs that had present in their blood on the first bleeding only one of the two antibodies (complement fixing or agglutinins) with one exception presented complement fixing substances first, the agglutinins appearing later.

outbreak it should be prepared from the strain in question —in other words, *autogenous* vaccination is indicated. In practice, however, this is not always easy, but one can improvise by linking together many strains and so making the stock vaccine *polyvalent*. This procedure I have found to work satisfactorily in practice, but here the dosage must be large. I usually give four injections. In the first three the antigen is composed of killed cultures and the fourth is attenuated. In mild outbreaks I omit the latter. This method of vaccination may be employed on the pregnant and non-pregnant animal alike and out of several thousand injections I have never traced an unsatisfactorily sequel, and further, the results have been highly satisfactory. Of course, like all other systems of treatment, it does not develop always a 100 per cent. immunity; one does occasionally meet with cases when the immunising responses to the antigen are so low that breakdown follows breakdown, but those are the exceptions, fortunately. I claim for this treatment a cutting short of the outbreak and the saving of large sums of money to those whose dairies are infected with what is now the most serious of all bovine scourges.

On the principle that an ounce of practice is worth a pound of theory I am tempted to add a few extracts from a letter recently received from a client, whose dairy herd was vaccinated a year ago:—

"Out of a dairy herd of 45 cows, on an average I have had about 30 abort at about six to seven months.

"I had 43 vaccinated last spring: 14 heifers were three months in calf and every one of them calved down all right. This for the last four years was a new experience to me.

"Out of the 29 cows only one aborted. I would like to mention one cow which aborted five times; in fact, she has never had a live calf and after vaccination she has produced her first full-time living calf.*

"This is one of the finest things I have ever had done to my dairy herd."

* For a cow to abort five times is a new experience to me—owners do not, as a rule, show such perseverance. Of course, it may be a coincidence that "full-time" followed vaccination, but it is very suggestive of active immunisation brought about by the vaccine.—W. S.

Breed Societies and the Royal Veterinary College.

Members of breed societies who would like to see some of the phases of the work of the Royal Veterinary College at Camden Town will have an excellent opportunity of doing so on May 27th. Miss E. Bradley, Hon. Secretary of the South-Eastern Jersey Club, has arranged for a visit of members of the Club to the College on that day, and is offering a very hearty invitation to all breed society members to join the party.

The visitors will assemble at the large lecture hall at the College, at 2.30, and will be received by the Principal, Professor Hobday. They will make a tour of the College buildings, in the course of which kinema films of operations on horses and cattle will be shown, and at 4 o'clock a lecture will be given on contagious abortion by Professor Wooldridge.

Captain C. W. R. Knight is to give his new film lecture "Sea Hawks" at the Agricultural Hall, Norwich, on May 7th, in aid of the Royal Veterinary College Rebuilding Fund. There will be two performances, and Professor Hobday will give a short talk at each performance.

The Veterinary Record.
May 16th, 1931.

Undulant Fever.

It is becoming recognised more and more that no chance of the veterinarian co-operating with the medical profession for the elucidation of problems concerning animal disease which may be communicated to man should be missed. The discovery of the similarity of the organisms responsible for undulant fever in man and contagious abortion in cattle, even if they are not actually identical, provides such an opportunity. It is now agreed that what we to-day call undulant fever is nothing else than what used to be known as Malta or Mediterranean fever, although perhaps in a somewhat less virulent form.

In an article on "The Correlation between Infectious Abortion in Cattle and Undulant Fever of Man," appearing in this issue, Bevan, of Southern Rhodesia, calls attention to the presence of both diseases in Rhodesia and shows that even in 1921 the veterinary profession in Rhodesia was fully alive to the possibilities of human infection and to the necessity of giving its hearty co-operation to the medical profession in dealing with the condition. The paper referred to by Bevan, which shows the active measures taken against contagious abortion in cattle by our colleagues in Rhodesia, was published in our columns on December 24th, 1921, long before the possibility of human infection from cows' milk was seriously thought of in this country.

As long ago as 1886, Bruce isolated the *Brucella melitensis* from the blood of human cases of fever in the near East, which finally led to the discovery of Zammit in 1905 that it was enzootic in the goats of Malta and that its occurrence in man was produced by drinking unboiled goats' milk. Only a year later, in 1887, Bang and Stribolt described the *Bacillus abortus* as the causal organism of contagious abortion in cattle, but it was left to Alice Evans to point out the similarity of the two causal organisms only in 1917. "It was," she wrote, "as if two brothers had been adopted by different families and given different surnames and for twenty years no one recognised the similarity of the boys because they were seen at different times and in different places." Doubtless the fact that abortion is the prominent symptom in cattle, while the disease in man is characterised by merely an indefinite and intermittent fever, is largely responsible for the discovery being so long delayed.

The first authentic cases of the correlation between undulant fever in man and contagious abortion in cattle to be described were those noted by Bevan and Orpen in Rhodesia and Keefer in the United States of America, who published

his report in 1924, but even in 1914 Kennedy drew attention to the presence of agglutinins to *Brucella melitensis* in the milk and blood of cows in London, and this was confirmed by others. It was not, however, until 1927 that the possibility of cows' milk transmitting undulant fever to man was taken seriously by the medical profession, since when cases have been reported, running into thousands, from such different countries as Rhodesia, America, Sweden, France, Germany, Austria, Denmark, Holland and, what concerns us most, from Great Britain. Sufficient proof has now been adduced to show that there can be no reasonable doubt that cases resembling undulant fever can, under certain circumstances, be produced by the consumption of cows' milk and also by the association with or the handling of cattle and pigs, and that this danger is present in this country as well as abroad.

There appears still to be considerable ignorance amongst the medical profession in general about this disease and probably the reason that so few cases have so far been recorded is the fact that little or no trouble is taken to ascertain how many cases of indefinite fever in man are really caused by this organism. There is yet much to be explained—as, for instance, its rarity in man when we know how prevalent contagious abortion is amongst our milking cows; what factors are necessary for its transmission to man; whether the use of live vaccines for cows can be considered to be fraught with danger to mankind and how many normal people's blood will react to the test for *Brucella*. To those interested in the subject we recommend the perusal of an excellent monograph "Undulant Fever," surveying the state of our knowledge of the disease, recently issued by the Ministry of Health.*

It is of the utmost importance to the veterinary profession, and especially to those members responsible for our milk supply, that further light should be thrown on many of the as yet unexplained phenomena and, if new legislation to deal with the danger is called for, that these should be in a position to advise those whose duty it is to frame it. Happily, the cases so far described in man are comparatively rare and mild, so that there appears to be no need for panic in consideration of the matter; nor, on the other hand, from its apparent rarity should we ignore its danger.

*Reports on Public Health and Medical Subjects, No. 56, "Undulant Fever, with Special Reference to Animal Sources of Infection and the Possibility of its Prevalence in England and Wales."

Nine of eleven cases of undulant fever, occurring in Waycross, Georgia, were investigated. Six had used raw milk exclusively and three had used it freely. Eight of the nine cases used raw milk from one dairy that contained cows that reacted positively to the abortus agglutination test. The evidence indicates that these cases of undulant fever were due to the porcine strain of the abortus organisms.

Eleventh International Veterinary Congress, London.

August, 1930.

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Treatment of Parasitic Diseases in Poultry.

By E. A. R. F. Baudet.

Institute of Parasitic and Infectious Diseases, at the University, Utrecht.

Dr. Baudet begins by asking three questions:—

1. Do parasities often cause losses, diseases, and deaths?

2. Are the majority of medicines commonly in use efficacious?

3. Are the time and expense used in the treatment, commensurate with the results obtained?

The intestinal parasites which we encounter most commonly belong to the species *Davainea, Ascaridia, Heterakis, and Capillaria.*

The presence of the species *Raillietina, Amœbotœnia* and *Choanotœnia,* is less frequently observed, and the parasites of these species are of little importance pathogenically.

Davainea proglottina, is a well-known parasite which, during some seasons (especially so during the last one) claims numerous victims. The symptoms of the disease are emaciation and diarrhœa, with later a progressive paralysis, beginning by weakness of the feet, gradually ending in death. The disease is especially fatal in young birds; older birds may suffer for weeks and even months. On *post-mortem* examination one finds innumerable parasites. The mucous membrane of the intestines shows dark red coloration.

The affection is met with especially in chickens, hatched in the early season. The aforesaid paralysis may be observed in birds which, on examination, proved to contain even a small number of these parasites.

This paralysis appears to be similar to that described by Marek, Van d. Walle and Winkler Junior, Pappenheimer, Dunn and Cone, with hypertrophy and inflammation of the lumbar and sacro-spinal glands.

The inflammation often extends into the nerves. Replying to the questions previously asked: Do the intestinal parasites cause disease and death? In the particular case under observation were the parasites the cause, or were they there accidentally, and some unknown virus the cause of the paralysis?—Pappenheimer, Dunn and Cone deny any connection between the paralysis and the intestinal parasites.

This question, so far as it concerns Holland, is still the subject of research.

Though the importance of *Davainea proglottina* in regard to the question of paralysis has diminished, our attention has again been drawn to this parasite by the publication of Bayon, who is of the opinion that it is incriminated in leucæmia (érythromyélite de Bayon).

I can affirm that, in leucæmia of birds, tæniæ were not observed. It is, however, possible that the parasites may have been there formerly; therefore, careful experiments are necessary before one can agree or disagree with Bayon's opinion.

Ascaridia perspicillum and *Heterakis vesicularis* are often observed, the latter nearly always in the cæcum of birds. In very young birds the cæcum often contains hundreds of worms, which gives one the impression that the contaminated fowls suffer from typhlitis verrucosa.

Ascaridia perspicillum is less frequently met with; however, one does observe in autopsies the intestines almost filled with parasites although, strange to say, the birds had in life no pathogenic symptoms proportionate to the intensity of the infestation. This is especially the case in aged birds, young birds appearing to suffer most.

One oftens encounters the species *Capillaria* (*C. retusa, C. collaris*). In young birds these parasites are most often observed in the small intestines. It seems that these nemotodes only rarely cause death, and symptoms are generally confined to young birds.

In aged birds such symptoms are exceptional, because they appear to possess some kind of immunity, probably because intestinal conditions were less favourable to the existence of the parasites. Since it is difficult to rid the birds of these parasites, it is obviously necessary to protect the young birds from infestation.

We will now deal with the second question: Are the majority of the medicines commonly in use efficacious?

In consulting the literature relative to the medicines used in general against tæniæ we find, in the first place, a mixture of the essence of terebene and olive oil in equal parts in common use. This medicine acts best when administered after a purgative—a teaspoonful of sulphate of soda; after which, the animals are fasted for 24 hours. One then gives, *per os*, 6 c.c. of the mixture and, three hours after, a second purgative. The results are good, but not absolute.

It is possible in a short time to treat a large number of animals by the mouth. Individual treatment is preferable to mass treatment. It is, however, necessary to observe that very often diarrhœa follows the treatment and that laying fowls, for a certain time, do not produce eggs. This medicine is therefore objectionable if the treatment is used as a preventative. Kamala is easily administered, given in capsules of one gramme, but even the use of kamala does not expel all the parasites, as we observed while making an autopsy. It would appear, therefore, that we always have "carriers" of tæniæ and that we also have to deal with the intermediate hosts.

For *Davainea proglottina* the host is *Limax cinereus*; for *Choanotænia infundibulum* it is the domestic fly (*Musca domestica*), without mentioning dung and soil beetles.

In dealing with tæniæ, destruction of intermediate hosts is at the same time necessary. Several drugs are used against nematodes; for example, tobacco powder (containing 1·5 per cent. of nicotine) mixed as two per cent. with dried food, during one month. In our experience, this acts well.

Beach and Dougherty and, later, Freeborn affirm the same good results (practically 100 per cent. expulsion). It is necessary to remark, however, that the birds do not take kindly to the mixture in their food, and that sometimes the treatment does not appear to give good results. This, however, is probably due to the small amount of nicotine in the tobacco.

In other cases the birds have lost weight, because they would not eat the food. Beach and Herms advise giving an infusion of tobacco, while S. B. Freeborn recommends for nematodes giving capsules containing sulphate of nicotine. These capsules contain each 350-400 m.g., of a mixture of 16 gr. of Fuller's earth and 7·92 gr. (6·6 c.c.) sulphate of nicotine (black leaf 40). About 97·2 per cent. of round worms were expelled by this means. Schlingman recommends tetrachloréthylene against nematodes and, if necessary, three days afterwards, kamala, if tapeworms are also present. By this means two kinds of parasites will be expelled.

Tetrachloride of carbon is also a good agent for round worms (Graybill). By this means 97 per cent. of *Ascaridia perspicillum* were expelled. Injections *per rectum* in a mixture of oil were most successful.

One can also employ, in the same manner, oil of chenopodium, doses per fowl being 0·1 to 0·2 c.c. in 10 c.c. of neutral oil.

The destruction of certain species of *Capillaria* is difficult in fowls. Rietz observed good results from tetrachloréthylene, while Lahaye found calomel of service.

We have made some very careful observations by examining the fæces of birds, following the method of Fülleborn, searching for the eggs of parasites after the use of medicines, and can corroborate the experience of Lahaye, *i.e.*, one ought never to deduce from the examination of fæces, the efficacy of one or other of the vermifuges; our examination, made in accordance with the method of Fülleborn, showed that, in 70 birds, we obtained 30 negative results. The birds were then killed, and in 30, despite the treatment applied, 21 were carriers of *Heterakis* in varying numbers. We therefore further support Lahaye in stating that a regular examination should be made during several days, before a definite opinion is given.

The following methods have been tried by the writer:—

Sulphate of Nicotine: Animals treated 33. Certain birds had four capsules in place of two; no accidents happened.

Results.—One week after the treatment the birds were killed. In five birds, no parasites; in 28 birds there were found a number of *Capillaria* and *Heterakis vesicularis*.

Of the first, we found one or more in the field of the microscope and, in the second, the quantity varied from one to 100. In four birds, we observed a quantity of tæniœ (*Choanotænia infundibulum*). Five of the 33 birds were treated twice by means of sulphate of nicotine, without obtaining better results.

Tetrachloréthylene. This medicine was given in capsules to 13 birds, to three of them twice. The dose was 1 to 2 c.c.

Result.—In two birds treated once, the autopsy showed no parasites. No eggs had been found in the excreta of these birds after they had been given the medicine.

In 11 other birds autopsy showed *Capillaria* and *Heterakis vesicularis* in variable quantities.

Oil of Chenopodium. Two per cent. in oil of sesame, administered *per os* or *per cloaca*.

We also gave the birds an aqueous solution of methylene blue. A quarter of an hour later they were killed. Out of four of them two had the mucous membrane of the cæcum and membrane highly coloured. In one bird the cæcum was not coloured and in the other slightly coloured.

This method, therefore, appears to be ideal for the

expulsion of *H. vesicularis* and perhaps of coccidia. In five birds the excrement of which contained a quantity of the eggs of *Heterakis*, three were treated *per cloaca* by giving 20 c.c. and two by giving 10 c.c. of a mixture of oil of chenopodium (two per cent.) in oil of sesame.

In two of the fowls, one found on autopsy, made one week later, *H. vesicularis*, while the other was free.

The same medicine was given *per os* to four fowls. These were treated twice with intervals of three weeks and then killed one week after the last administration.

In two of the fowls the dose was 20 c.c. (two per cent. oil of chenopodium in oil of sesame).

Result.—In one fowl in which no eggs of *Heterakis* had been found in the excreta, no worms were observed, while in three, one found more or less 50 to 100 *H. vesicularis*.

Essence of Terebene. This medicine, mixed with an equal quantity of olive oil, was given *per os*, the dose of the mixture being 6 c.c. It is not dangerous and large quantities can be given; for example, one bird was given *per os* 20 c.c. without any bad results.

Results.—Six birds were, before treatment, recognised as being affected with *Capillaria* and *Heterakis*. The medicine was given twice with three weeks interval.

Only one fowl was found free from *Capillaria*, but it contained 20 *H. vesicularis*. In the others we found *Heterakis* more or less and, respectively, 20, 40, 50, and 100 worms in the cæca.

Calomel. Six fowls were treated *per os* with a dose of 300 mg. in the form of pills mixed with cachou (q.s.).

The birds were fasted and received, three days following, one pill *per os*. On examining the fæces of the fowls, we found they contained *Capillaris* and *Heterakis*; on autopsy, two fowls were found free from *Capillaria*, but the others contained 30, 40, 80 and 100 *Capillaria*.

What, then, are the conclusions that one can draw from these experiments? In the first place, it is evident that sulphate of nicotine, tetrachloréthylene and calomel were not capable of expelling *Capillaria* and *Heterakis*, though they did expel some of the parasites. Injection *per cloaca* of oil of chenopodium has given good results concerning *H. vesicularis*. We cannot express any opinion as to the effects of it on *A. perspicillum*, as the birds were not infected by these parasites.

It is obvious that the young birds are more sensible to parasite infection. The experience of J. E. Ackert is interesting from this point of view. He could not infect chicken below the age of three months with *A. lineata*, despite the administration of hundreds of eggs of the worms.

Herrick found that birds 103 days old were 50 times more resistant against the infection of *A. perspicillum* than chicks five days old.

Experimental birds which were badly infected during the first weeks of their lives rapidly expelled the parasites so that, apparently, they disappeared during the first five months of their existence.

We are also ignorant of the conditions which favour the maintenance of the parasites in the intestines of young birds and are unfavourable to them in adult birds (Sandground).

The same thing seems to apply in young foals and in older horses concerning *Parascaris equorum*.

The chances of re-infection still exist and it is important, as in all parasitic diseases, to attempt to cut the cycle between parasites and the intermediate hosts.

One observes, from time to time, birds which during their life had not presented any symptoms of parasitic diseases and yet in which, on *post-mortem* examination, we have found many intestinal parasites. It is therefore difficult to conclude whether or not the worms which we have observed ought to be considered responsible for symptoms of certain diseases.

Again, one observes cases where the intestinal parasites are evacuated without any special precautions having been taken in regard to the application of treatment.

This can perhaps be attributed to an increase in the resistance of the birds to the infestation.

We must therefore be very prudent in forming a judgment as to any specific action of the medicines employed, especially by the examination of the fæces, which so often gives false results. Only laboratory experiments, followed by autopsies, can give any certainty on this subject.

The difficulty of anti-parasitic treatment is often due to mixed infestations by various parasites. For all such cases, different medicines have to be employed. It is for this reason that, in Holland, one often hesitates to attempt treatment by medication and prefers to wait expectantly to see what happens, with the result that much damage is done.

From a treatment point of view, we may take as an example the difficulty with coccidiosis: it is useless to give a long series of medicines which have been employed against this infection. For those who want to study them we would refer to the work carried out during the last years by Reismuller and Lutz, Quiroga and Scasso, Lahaye and Krijgsman, all of whom have shown that, for birds, no specific treatments are as yet known.

We might also refer to the work of Marek & Co., with "Iodine Suspensoid" on the disease in America. According to Gildon it fails to cure acute coccidiosis.

In dealing with this disease, one is completely reduced to preventative means. My opinion is that in the struggle against intestinal parasites we ought to pay special atttention to preventative measures, especially in young birds. These means are so well-known that it is not necessary to discuss them in detail, but I would especially refer to wire netting flooring, thanks to which one can reduce contagion during the first period of life.

One difficulty, contamination of the ground, remains. However, here also one can obtain good results, taking particular care in keeping the hen-houses and enclosures dry, and sometimes in preventing the birds going near ditches and ponds, by giving them pure water.

This is one of the most important means of avoiding parasitic disease. One can, however, do much by confining the birds to closed hen-houses or in closed surroundings. This method is receiving more and more attention. If one could succeed in introducing this method of raising poultry with success, one would, at the same time, to a great extent, prevent intestinal parasitic diseases, for if this were done, the development of the parasites would be so diminished that new infections would be practically excluded.

The author gives a long list of works consulted, including:—Baudet; Bayon; Beach and Warren; Bleak and Baudet; Broerman, Cram, Freeborn; Gallagher;

The Treatment of Parasitic Diseases of Poultry.

By Dr. J. Lahaye.
School of Veterinary Medicine, Brussels.

Dr. Lahaye begins by stating that, if one studies the reports published each year from different laboratories, one observes that parasitic infections are amongst the most frequent of avian diseases, being about 28·8 per cent., and that one can count 54 different types of parasites capable of causing diseases of poultry leading eventually to death. Further observation of the treatment of the diseases shows that over 72 different parasiticides have been tried, and that, for one disease alone (for example, coccidiosis) successful claims have been made for at least 29 different medicines. Continuing, he says: Our own studies show :—

1. That parasitic diseases are of considerable importance.

2. That the parasites are both numerous and varied.

3. That the medicines employed against the diseases are far from being as successful as the claims made for them would imply.

4. That the problem which has been placed before us fully justifies the attention that we have accorded to parasites.

In our studies, in order to simplify the work undertaken, we divide the parasites into two groups :—

1. Ectoparasites.

2. Endoparasites.

Amongst the affections due to Ectoparasites, we examined successfully :—

(*a*) The Entomiases.

(*b*) The Acariases.

(*c*) The Dermatomycoses.

The Endoparasites were studied under the following headings: those affecting the digestive, respiratory, genito-urinary and circulatory systems.

Lastly, we studied the parasites, or their hosts, which most commonly affect them.

1. Ectoparasites.

(*a*) *Entomiases.*

The Entomiases belong to two orders :—

1. The Diptera.

2. The Hemiptera.

The Diptera are those insects which suck the blood; they are furnished with a blood-sucking apparatus, and salivary glands which secret a venomous product which provokes a local pain after the puncture.

The Hemiptera are also blood-suckers and attack all the birds.

1. We found the bugs (*Cimex columbarius, Cimex inodorus*), which attacks fowls and pigeons in the nest, more especially during the night, and, as a general rule quit their hosts during the day. The treatment adopted was to show :—

(*a*) How to free the host from the parasites and their eggs by using three times, with six days interval, anti-parasitic baths made up of a solution of half per cent. sodium fluoride.

(*b*) To destroy the parasites in their habitats.

Bugs are very resistant, and apparently can live for several years without food. Up to the present all the products tried in the form of vapours or powders have proved useful, but none of them have been radical or specific in their action. For this reason we proceeded as follows :—

(*c*) To prevent the parasites attacking poultry. In doing so we found that certain gums were useful, especially one, termed "Clear gum."

2. The fleas (*Pulex rufus, P. avium*) yielded to insufflations of powder of pyrethrum and a mixture of flowers of sulphur and a powder of staphisagria, but these treatments, although palliative, did not kill all the parasites.

3. The *Sarcopsylla* disappeared under the same treatment which was used against the bugs.

4. Certain beetles (*Tenebrio molitor, Silpha opaca*) also yielded to the same treatment.

5. The Mallophaga, related to the Hemiptera (*Lipeurus, Goniodes, Goniocotes, Menopom*), nourish themselves in the epidermic debris, irritate the skin, by their discharges and gnaw the feathers.

Two different methods of treatment have given us good results. These are baths of sodium fluoride, half per cent. Odylen; the latter is applied to the body by making smears one to two centimetres apart—two applications, with six to nine days interval.

(*b*) *Acariases.*

1. *Sarcopitidæ.* (*a*) *Cytoditinæ.* Two parasites of this sub-family. The one, *Cytoditis nudus,* in the conjunctive tissue; the other, *Laminosioptes cysticola,* in the aerial reservoirs. So far as we are concerned, we have only encountered *C. nudus,* which does not seem to affect subjects which carry them.

(*b*) *Sarcoptinæ.* The acari of this sub-family are in two categories. One attacks the body and the feathers, causing mange and loss of feathers, while the other is a mange parasite affecting the legs and the feet. Amongst the first, we found *S. lævis*; amongst the others, we only observed *S. mutans.* In practice this condition is often mistaken for entomiases due to Mallophaga. It should be observed in that which concerns the chickens, that the latter affect the young. They are sheltered under the mother after hatching. Pigeons are affected in the same way.

It is only in the following year that they show the first signs of infestation which they have contracted in their earlier age. In the treatment of leg and foot mange, we have tried creoline, glycerine, etc., but in the end we have confined ourselves to Helmerich's ointment, to which we add 10 per cent. salicylic acid.

2. *Analgesidæ.* These acari—*Pterolichus, Falculifer, Dermoglyphus, Megninia, Epidermoptes,* etc.—are found on all species.

As these are air-breathing mites, measures for their destruction by the use of pyrethrum powder gave good results. We used half per cent. sodium flouride at several days interval.

3. *Thrombidiidæ.* Amongst these we found *Cheyletiella heteropalpa,* which lives at the base of feathers of doves;

Graham, Thorpe and Hectorne; Gildon; Graybill and Beach; Hebrant and Liegois; Krijgsman; Lahaye; Marek; May-Tittsler and Goodner; Pappenheimer, Dunn and Cone; Quiroga and Scasso; Reismuller and Lutz; Sandground; Schlingman; Solowskosky; Van de en Walle, and Winkler Junior.

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Sarcopterus nidulans, living in colonies in the follicules of the feathers, where they cause small tumours; *Syringophilus bipectinatus*, and lastly, *Thrombidium holosericeum*. Treatment consists of sulphur baths. Those practising it should be sufficiently closely acquainted with the study of the habits of each species, *e.g.*, *Cheyletiella*, to see that the powder penetrates the material, etc., in which the eggs are deposited, and in *Sarcopterus nidulans*, that the tumours are opened and cleaned and that the medicament penetrates the follicules. Intervals of three days in the treatment are necessary.

4. *Ixodidæ*. Those included *Argas reflexus*, *Argas persicus*, and *Argas persicus miniatus*, the last being the transmitting agent of the spirochæte of fowls. All the acari avoid the light. Treatment the same as for the bugs.

5. *Gamasidæ*, the most common being *Dermanyssus gallinæ*. Treatment as for *Ixodidæ*.

(c) Dermatomycoses.

Include *Lophophyton gallinæ*. Treatment, glycerine iodide 20 per cent.

2. Endoparasites.

A few useful observations may here be made.

1. A great number of internal parasites follow a well-defined cycle. For some, the cycle is well known, while in others it is incompletely or totally unknown, and for this reason therapeutics are as yet uncertain.

2. Certain parasites do not pass all their life in one host and another host is neecssary for their complete evolution. This, again, is one of the difficulties in treatment.

3. Certain species of birds appear to support easily parasites which are dangerous to other birds.

4. Certain parasites themselves constitute the intermediate host of parasites of another class.

5. Certain species of parasites act: (1) by injuring their host; (2) by eliminating various toxins and (3) by provoking a local irritation.

6. One must not conclude, when the fæces are examined once and few parasites found, that the host is not heavily infested. It is necessary to make several examinations and at repeated intervals.

7. It is due to the last-mentioned error that claims for the success of certain drugs have been made which were not justified by extensive trials over a long period or by different observers.

A.—Parasites of the Digestive Organs.

1. *Oidium albicans* is the most common parasite amongst pigeons and specially those birds fed on acid foods.. We also found that it is very often associated with coccidiosis in pigeon lofts.

Treatment. Alkaline solutions or a solution of 1 in 5,000 sublimate.

2. *Nematodes*. This class of Nemathelminthes is found very often amongst fowls, especially the genera *Capillaria* (or *Trichosomum*), *Heterakis*, *Ascaridia*, *Amidostomum*, *Tetrameres*, *Spiroptera* (or *Dispharagus*) and *Trichostrongylus*.

(*a*) The genus *Capillara* furnishes many species but, chiefly, *C. collaris*, *C. columbæ*, *C. strumosa*, *C. contorta*, and *C. retusa*. They affect gallinacious birds and doves, causing a green diarrhœa, rapid emaciation, nervous symptoms and death.

They are chiefly found fixed to the mucous membrane of the small intestines.

Treatment. It is very interesting, from a medical point of view, to note that we tried santonin, calomel, oil of chenopodium, sulphate of nicotine, kousso, pot. bichromate, ferri perchlor, kamala, male fern, arecoline, pelleterine, thymol, oil of filmaron, ipecacuanha, aniseed chloroform, tansy, betanaphthol, carbon tetrachloride tetrachlorethylene, sulphate of copper, salts of quinine, bismuth subnitrate and carbonate, sublimate, terebene, powdered tobacco and many other drugs, but these were the most important.

Calomel in doses of two centigrammes for three to four days, seemed to produce a diminution in the number of eggs and parasites in the fæces, but on continuing the medicine during eight days or even one month we did not find the least effect. Bismuth carbonate did not eliminate trichosomes, but it did favour greatly the cicatrisation of the lesions in the intestines, and the birds rapidly gained weight. Great care was taken to prevent infection, by keeping the birds under treatment on metallic gratings.

With Professor Huynen, we observed one pigeon nearly dead due to the effect of trichosomes; it was emaciated, was voiding a hæmorrhagic diarrhœa, and weighed only 325 grammes. After eight days' treatment it weighed 340 grammes and after 15 days 440 grammes.

We did not find any treatment successful against *Capillaria* of fowls.

(*b*) *Amidostomum* we found particularly in geese. The same treatment as for *Heterakis* has proved successful.

(*c*) The genera *Ascaridia* and *Heterakis* we found represented by *H. columbæ*, *H. dispar*, *H. vesicularis* (*papillosa*) in the cæca, and *A. perspicillum*, which lives in the duodenum.

Before dealing with treatment for helminithiases, let us make a few remarks on these parasites.

Certain *Heterakis* seem to be carriers of the germ which causes, in turkeys, the disease well known under the term "Blackhead"; while it appears that turkeys do not suffer much from the helminths (*Heterakis*). For this reason, turkeys and fowls should not be kept together; on the other hand, turkeys are normal carriers and appear to be indifferent to the *Syngamus*, so pathogenic to fowls.

We found *A. perspicillum* particularly in the anterior parts of the digestive tube and *H. papillosa* in the cæcum.

Lastly, we do not know the intermediary host; the infestation appears to be *via* the fæces, which contain the eggs and parasites, which are very resistant to treatment.

Such treatment should include scrupulous hygiene, medicines, tobacco powder (two per cent. in the ordinary ration) for at least one month, associated with a mixture of 250 grammes equal parts of sodii sulph. and mag. sulph. for 50 fowls.

This treatment could not be carried out for pigeons. We tried pills, but later, after trying many drugs, found one which gave satisfaction, *viz.*, tetrachlorethylene, in doses of one gramme per subject.

First Day. Usual diet, with 2·5 grammes of sodii sulph. per litre added to the drinking water. The drinking water was withdrawn in the evening.

Second day. In the morning, without any food being given, we administered the medicine in gelatine capsules.

Four hours later the water, with the sodii sulph., was given; then, two hours later, a little food was given. The worms were evacuated two to three hours after medicine was administered.

(*d*) The habits of the *Tetrameres* are not well known.

(*e*) *Spiroptera* live embedded in the mucous membrane of the gizzard and *Dispharagus* in the œsophagus.

At present, curative treatment appears to be unknown. Iodine solution, one in 1,000, has been used as a preventative. It kills eggs and parasites rapidly.

(*f*) We, as yet, have not found any specific for Trichostrongilidæ.

3. *Cestodes.* This is an important group and we found them in fowls, turkeys, ducks, geese and, rarely, in pigeons. Most of them require an intermediary host; they attach themselves to the digestive mucous membrane and secrete toxins, which cause nervous symptoms. They are hermaphrodites and follow the usual life cycle.

Treatment. We found successful results from the use of essence of terebene and kamala, the latter in doses of one gramme; a pigeon can safely be given a dose of 50 centigrammes.

Prevention. Good hygiene, especially of benches and flooring. Destroy all intermediary hosts.

4. *Trematodes.* In this group, we only found, in the digestive organs, the Echinostomidæ, amongst which, *E. echinatum* and *E. echinoparyphium* are the best known.

The species are very common in the intestines of aquatic birds. Their intermediary hosts are the molluscs, *Limnea ovata, and L. stagnalis* or frogs, *Rana temporaria,* and toads.

Treatment. Tetrachlorethylene.

Prevention. Hygienic measures kill intermediary hosts.

5. *Protozoa.* This branch furnishes parasites of birds. Two amongst theme are of special importance: (*a*) Coccidia, and (*b*) the causal agent of entero-hepatitis of turkeys, well known as "Blackhead." The latter requires further study, as authors differ in their opinion as to the cause of the disease.

Coccidiosis. We know the life cycle of the parasite, also that it is very fatal, especially to young subjects.

In others an immunity seems to be acquired. How is this brought about; is it due to continual small doses of the oöcystes or to the pH of the intestinal content? If so, what is the pH most favourable to their evolution?

At present these questions are not answered. Certain facts are obvious:—

1. That cured subjects are difficult to reinfect.

2. That certain subjects resist infection.

3. That immunity is slowly acquired, and birds remain "carriers" and appear to be sufferers for several years.

In our opinion, none of the medicaments is specific and favourable results are more often due to changes, modifications, disturbances and altered chemical contents of the intestines. Buttermilk, quinine, sulphur cachou, pot. bichromate, and sublimate are used, but even the most successful of those require to be given for weeks or even months.

B.—Parasites of the Respiratory Organs.

Monostomidæ, Syngamidæ, and Aspergillus, Monostomum mutabile—found in the nose, infraorbital sinuses, larynx, trachea, lungs, and ærial reservoirs of aquatic birds.

Treatment is non-specific.

Syngamus trachealis and *S. bronchialis.* We have nothing to say as to the classic treatment of injections into the trachea of a solution of five per cent. of sodii salicylate, nor as to the preventative used of giving, in the drinking water, the same medicament in a strength of two in 1,000. Treatment for Aspergillosis is as yet uncertain.

C.—Parasites of the Genito-Urinary Tract.

Prosthogonimus pellicidus, and *P. intercallendus* live in the oviducts and provoke Salpingo-ovaritis. The intermediary host is the dragon-fly.

Treatment is non-specific.

Renal coccidiosis of geese is occasionally found.

T. D. Y.

In Parliament.

The following questions and answers have been recorded in the House of Commons recently:—

Animals (Experiments).

Mr. Freeman asked the Home Secretary whether experiments in gland grafting on animals are operations which require a licence under the Cruelty to Animals (Vivisection) Act?

Mr. Clynes: All experiments on living animals, if calculated to give pain, are subject to the Act and require a licence.

Mr. Freeman asked the Home Secretary which variety of licence to experiment on living animals was granted to G. P. Male, of Reading, during 1930 or 1931; what animals were involved; and how many experiments were performed?

Mr. Clynes: No licence has been granted to this gentleman. I am not in possession of the information specified in the last two paragraphs, but I am making inquiries into the case.

. . . . .

Research Experiments (Living Animals).

Mr. Freeman asked the Home Secretary whether he can now state the total number of experiments on living animals performed during 1930 with and without anæsthetics, and the number performed for the purpose of cancer research with and without anæsthetics?

Mr. Clynes: As there are a few returns from licensees still outstanding the final figure cannot yet be given. It is not expected, however, that these will make a material difference to the total. The available returns show that 450,744 experiments were performed under the Act during 1930, of which 432,474 were without anæsthetics and 18,270 with anæsthetics. The number performed for cancer research was 25,259, of which 23,964 were without anæsthetics and 1,295 with anæsthetics.

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Veterinary Colleges.

Sir W. Jenkins asked the Minister of Agriculture what number of veterinary colleges there are in this country; what number of such colleges there are in Germany, France, Russia, and the United States of America; what financial aid by way of grants is made to British colleges; and what number of students are attending?

Dr. Addison: There are two veterinary colleges in England and Wales, five in Germany, three in France, 14 in Russia, and 11 in the United States of America. My Department makes annual maintenance grants to the two English colleges as follows: £3,300 to the Royal Veterinary College, Camden Town, and £2,850 to the School of Veterinary Science at Liverpool. These grants are fixed block grants for a period of five years and the amount in each case is now under consideration. There are 200 students at the Royal Veterinary College and 61 at the Liverpool School.

Clinical and Case Reports.

Sarcomatous Lesions in a Dog.

Professor S. H. Gaiger, F.R.C.V.S., Department of Veterinary Pathology, University of Liverpool.

The accompanying photographs and photomicrographs may interest readers of the *Veterinary Record,* as they show, adjacent to each other, the macroscopic and microscopic appearances of a malignant tumour.

For the history of the case I am indebted to Mr. E. Brayley Reynolds, M.R.C.V.S., and the material was kindly sent for the museum of this Department by Dr. A. L. Sheather.

Subject and History.—Golden Retriever. Six weeks before the case was visited the keeper noticed the dog frequently straining to pass fæces when exercised. The motions were always loose, but in two weeks' time they were observed to be discoloured with blood. The dog fed well for five weeks, principally having tripe. Vomiting never occurred. The diarrhœa and amount of blood got steadily worse. Two weeks before professional advice was sought the rectum slightly prolapsed, but was easily replaced during the first day or two, then it gradually got worse. For the last few days the dog was straining every few minutes in an effort to pass something. Food was never refused and the dog even took a half-a-pound of tripe on his last evening. That evening the dog was examined and next day an exploratory laparotomy was performed. When the state of the organs was revealed the animal was allowed to die under the anæsthetic.

Fig. 1 shows three mesenteric glands and about nine inches of small intestine. The centre gland was 2½ inches across and consisted entirely of sarcomatous tissue. The lumen of the bowel was practically occluded by tumour tissue, large masses projecting from the wall of the bowel. The largest lymphatic gland may have been the primary seat of the tumour, and it is well-known that the small, round-celled sarcoma usually originates from lymphoid tissue. Possibly, however, in this case the primary lesion was in lymphoid tissue in the wall of the bowel.

Fig. 2 shows the liver and one kidney. Portions of liver tissue have been removed by the knife to show how the liver parenchyma has been invaded and destroyed by the tumour tissue. The kidney was cut in half to show the extent of the lesions. The tumour tissue was soft and greyish-white in all the lesions. The nodular, infiltrating and lobular character of the malignant growths is well seen in the various liver lesions. In the centre of the liver the tumour tissue is seen to have broken through to the surface of the organ and the bulky appearance of the whole organ is well illustrated. The section through the kidney illustrates how the new tissue bulges the organ.

Fig. 3, *x* 100, shows a section of the kidney tumour near the junction of neoplasm and kidney tissue . A glomerulus and numerous tubules can be seen cut off and surrounded by tumour cells.

Fig 4, *x* 100, shows the actual junction of kidney and tumour tissue. Just at this place in the line of demarcation there is a distended vein. Above this vein can be seen isolated kidney tubules cut off by the tumour cells.

Fig. 1.

Fig. 3.

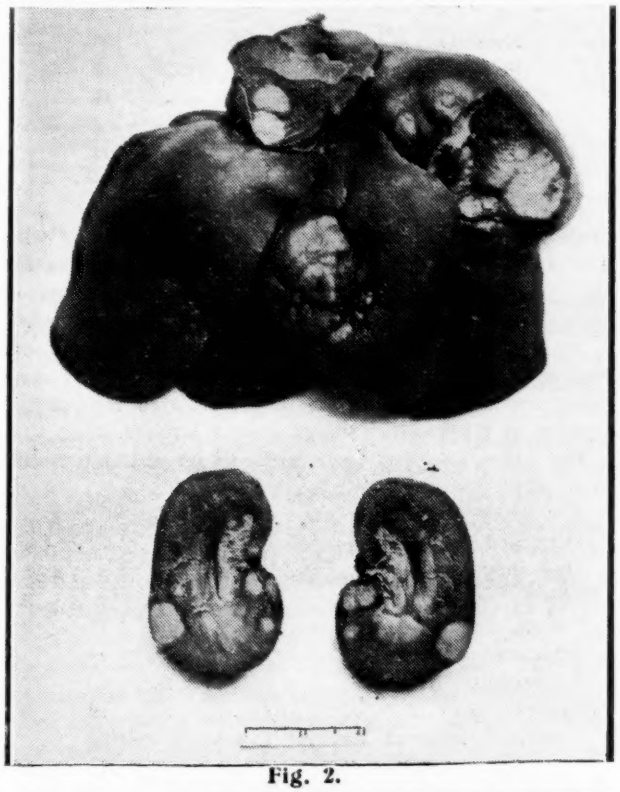

Fig. 2.

Fig. 4.

Report on Castration of 303 Arab Stallions of the Trans-Jordan Frontier Force,

Between November 22nd, 1930, and March 3rd, 1931.

By H. A. Idenden, Captain, R. of O., R.A.V.C., Senior Veterinary Officer, Trans-jordan Frontier Force.

1.—On its formation in April, 1926, the Trans-Jordan Frontier Force was based on the principle adopted in Sillidar Corps, each trooper owning his individual horse, purchased as a remount by a Board of Officers, including the Senior Veterinary Officer, the purchase money being advanced by Government to the trooper, and paid back by him in monthly instalments from his pay until the whole amount had been refunded, the horse then becoming the property of the trooper.

2.—Owing to all these Arab horses being entire, cases of savagery and riot in the ranks were constantly occurring, and the stallions were uncontrollable in the presence of mares; in addition, in dismounted action, continual fighting occurred between the held horses, with consequent breaking loose from the horse holder holding four horses. Again, when picketed out in open lines, cases were frequent of horses drawing picketing gear, bolting through the lines, savaging other horses, and causing injury both to themselves and other horses from the picketing peg attached to the leg; castration was therefore decided upon.

3.—Before Government would give permission for wholesale castration, however, a limited number, 30 stallions of all ages up to 14 years old, were castrated during the winter of 1929 and 1930 as a test, by the Senior Veterinary Officer, Trans-Jordan Frontier Force, with good results. From this experiment, Government then decided:—

(*1*) To effect the purchase of horses of Headquarters and two Squadrons.

(*2*) To castrate all horses purchased.

(*3*) To castrate such of the privately-owned horses remaining on the strength of the Force whose owners were willing for this to be done, on the following conditions:—

(*a*) If the animal died or became useless by reason of the operation, Government will stand the loss, and

(*b*) When the owner takes his discharge, Government will purchase the animal for re-allotment at a valuation fixed by a Board of Officers, provided the animal is passed as fit for service at that time.

(4) For the purposes of valuation and purchase, an independent Board, composed of the Chief Veterinary Officer, Government of Palestine, and the Manager of the Government Stud Farm, Acre, Palestine, were appointed to pass animals as suitable for purchase by the Government, and to set a price on them.

Out of a strength of some 470 stallions, 320 were so purchased by Government, with authority to castrate.

(5) On consultation with the Chief Veterinary Officer, Government of Palestine, it was decided to operate in the cold weather of the winter months only, owing to the risk of fly infection of wounds during the heat of the summer months. Horses to be castrated at the rate of 60 per month, in batches of 20—a score from each of the three Squadrons at one time; the Chief Veterinary Officer kindly detailing four of his veterinary officers to assist in the work under my supervision.

Work was commenced at Zerka on November 22nd last year, with seven horses of Headquarters and 20 horses of "A" Squadron, by the veterinary officer, T.J.F.F., and myself, followed by 20 horses at Samakh on December 1st last year and 10 horses at Beisan on the same date—these latter being operated on by Palestinian veterinary officers.

A second series of 60 horses was operated upon by Palestinian veterinary officers, in batches of 20, commencing at Zerka on December 29th with 20 horses, the remaining 40 horses in the Jordan area being castrated on January 5th and 6th.

(6) In all, 303 stallions have now been castrated, the oldest horses being 14 years of age, and the youngest a remount of three years old.

The longest period of recovery in the first batch of horses operated upon before return to duty was 26 days; the shortest being seven days (the three-years-old remount).

In young horses up to five years old there seems to be but little physical disturbance; the wounds heal quickly with little after-treatment, and horses are back at work in a fortnight.

In the older horses of eight and nine years of age, the healing of the scrotum is more protracted, and there is some inflammation of the cord: and here it should be noted that many deviations from normal testicle and cord are met with. In all cases of old horses the cord is very thickened—in some cases the cord is calcareous as well as the testicles.

The testicles are frequently enormous in size, sometimes showing varicocele, hydrocele, and, in some cases, huge cysts, and occasionally there is trouble with hæmorrhage from abnormal development of the veins of the scrotum.

Cases of hæmorrhage immediately after operation occurred, but all were controlled by the application of artery forceps.

All horses were kept on a short ration for a week prior to operation, and food withheld on the evening previous to, and morning of, operation, before being cast and chloroformed.

It is found that 4-6 drams of chloroform is sufficient completely to anæsthetise these small Arab horses. In some cases, after receiving one ounce of chloroform, especially with the older horses, difficulty was experienced in bringing them round.

With three parties of men casting one horse after the other, a horse always lying ready cast for operation, the time taken to chloroform and operate on 20 horses is a few minutes under two hours, by two quickly-operating veterinary officers.

The methods of casting employed were:—

(i) Chain hobbles, and detachment of one hind leg;

(ii) a casting harness of American pattern, which was found to be extremely good, and

(iii) the ordinary long rope, looped over the neck, according to the choice of the veterinary officer.

(7) The operation was performed variously by actual cautery, Haussmann—Dunn emasculator, a German emasculator of Hungarian pattern, Reliance castrator, and by wooden clams left on the cord for a period of six days.

The figures for methods employed are as under:—

Actual Cautery	7
Haussmann-Dunn	120
Hungarian Castrator	160
Reliance Castrator	2
Wooden Clams	14
	303

It is found that where the emasculator has been employed for operation, wounds heal far more quickly with less swelling than in those horses where actual cautery or wooden clams have been used. The latter method proved to be unsatisfactory, and is not recommended.

(8) Unfortunately, the series of operations was not entirely without fatal result, one horse, eight hours after being operated upon, having to be destroyed through the descent of the bowels through scrotal wounds.

One horse also died from acute diffuse peritonitis, after operation.

The untoward sequelæ were the following:—

Destroyed (as stated)	1
Died (as stated)	1
Abscess in scrotum	2
Hernia (requiring sutures)	2
After hæmorrhage (two severe, with difficulty in arresting)	17
Cryptorchid	2
Lameness incurred through injury in casting (recovered)	1
Abnormal testicles	8
Diseased spermatic cord	2
Scirrhous-cord (horses having to be operated upon afterwards, for removal)	1

(9) The ages of horses operated upon are as shown below:—

Years.	Number of Horses operated upon.
3	2
4	12
5	39
6	20
7	28
8	74
9	63
10	40
11	15
12	7
13	1
14	2
	303

As stated, the longest period during which horses castrated were absent from duty amounted to 26 days, and the shortest seven days, giving an aveargе of 22·8 days.

After operation, food and water are withheld for a period of one hour, and the horse prevented from lying down the first night after operation, by having the head racked up. Until the healing of the scrotal wounds, horses are kept on a light diet of bran, hay and green fodder, barley not being fed.

(9) Each horse is exercised in hand for half-an-hour three times daily—morning, noon, and evening. This is an essential part of after-treatment, together with daily inspection of wounds, and after-dressing.

Reviews.

[**Schlachthofbetrieblehre—Ein Gundriss der tierärztlichen Verwaltung von Schlacht—und Viehöfen.** Von Dr. med. vet. Hans Kuppelmayr, Berlin, 1931. Richard Schoetz, Wilhelmstrasse 10, Ladenpreis 12 m. 60.]

This work on abattoir routine is an outline of the veterinary administration of slaughter-houses and cattle markets. Its author is the Director of these municipal undertakings in Munich. In the preface he explains that the work is the outcome of a series of lectures delivered at the Hanover Veterinary School to abattoir veterinary surgeons. He maintains that abattoirs can only be properly run by those thoroughly versed in veterinary science.

It may be of interest to quote some figures with regard to the number of veterinary surgeons employed on this work in Germany. Out of a total of 1,193 so engaged, 618 are actually occupied in the inspection of food and 575 as directors or superintendents of the whole buildings. Of the latter, 418 are whole-time officers and 157 part-time. Of public slaughter-houses in areas with over 10,000 inhabitants, 348 are controlled by veterinary surgeons and 22 by laymen. In towns of under 10,000 citizens 227 abattoirs are supervised by veterinarians and 133 by laymen. Prussia has 395 abattoirs, Bavaria 100, Saxony 34, Wurtemberg 62, Baden 76 and so on. These figures must excite our admiration and show that there is a need for the present work in Germany.

In 212 pages the author deals with all the essential aspects of the subject with great thoroughness. After a few pages of "General Remarks," the administration, personnel, and requirements of every department from Manager's Office to Refrigerator and Machine House are fully discussed, even to the most minute details of book-keeping and card-index systems. The duties of all the staff are described—director, chief veterinary surgeon, assistants, trichina inspectors, transport foremen, etc.

There is an account of insurance schemes for staff and animals and, finally, a chapter on other problems, such as committees.

Unfortunately, there will be little demand for this book in England as so few veterinary surgeons are engaged in this work. In America and the Colonies, however, it should be appreciated. It will nevertheless be read with interest by those in this country who are connected with abattoirs and cattle markets. It can be recommended to those who have the shapings of the future of the veterinary profession in their hands.

A. W. N. P.

(10) With regard to the systemic effect of castration, though in some cases the result has been for horses to lose their necks, in most instances the horses have improved in condition, and put on flesh.

(11) In concluding this report, I have to express my thanks to the Chief Veterinary Officer, Government of Palestine, for his advice and assistance with veterinary officers, without whom the work could not have been completed before the hot weather of April next.

"Indian Journal of Veterinary Science and Animal Husbandry."

Three new journals have recently been launched by the Imperial Council of Agricultural Research in India, namely, *Agriculture and Live Stock in India*, which is issued bi-monthly, at the small charge of 9s. 9d. per annum, exclusive of postage; *The Indian Journal of Agricultural Science* (subscription 16s. 6d., *plus* postage), and *The Indian Journal of Veterinary Science and Animal Husbandry*, which is to be issued quarterly (subscription 8s. 3d., *plus* postage). Communications respecting these Journals may be addressed to the High Commissioner for India, India House, Aldwych, London, W.C.2.

The first number of the last-named journal contains articles on "Directions for the Serum-simultaneous Anti-rinderpest inoculation of Cattle," by Hugh Cooper, M.R.C.V.S., and "Three-day Sickness of Cattle," by S. K. Sen, M.Sc. Reprints of selected articles from European journals are given, together with abstracts and a list of publications on animal nutrition and genetics.

The hope is expressed in the preface that this journal may not suffer, as its predecessors did, from the lack of sustained support, and we cordially join in that hope. There is no lack of material in India, and there are men well qualified to contribute to such a journal. We wish the new venture every success.

Louping-Ill Investigation.

"A broad survey of the present position of the investigation of louping-ill in Scottish sheep, which has been undertaken by the Animal Diseases Research Association, Edinburgh, has been prepared by Dr. J. Russell Greig, director of the Moredun Institute, and his co-workers at that institution," says *The Scotsman*. "The cause of the essential pathology of louping-ill has now, it appears, been determined, and while the investigation has so far failed to incriminate the tick as a causal factor in the disease, the available evidence does not negative this possibility. Heavy tick infestation such as occurs in the louping-ill areas has a marked debilitating effect upon the sheep, which frequently become rapidly reduced in condition and weight during the height of the infestation. It is therefore considered possible that tick infestation may itself predispose the animals to attack. The possiblity that infection with one virus may awaken into activity a different and latent virus infection has received considerable attention during recent years, and it is conceivable that the "tick fever" which has been shown to follow experimental infestation may activate a latent louping-ill virus of which many sheep may be carriers. It is intended to test such speculative views during the course of the investigation. Although the means by which infection occurs under natural conditions are still unknown, experimental evidence suggests that the disease may be contracted by the nasal inhalation of virus. It has been found that sheep can be immunised against the intra-cerebral injection of virus, a procedure which constitutes a very severe test of immunity, but it yet remains to devise a safe and effective means of protection against the natural disease, and research to this end is in active progress."

According to a statement appearing in the *Berliner Tierarztliche Wochenschrift*, there are 1,365 regular students enrolled in the five German veterinary colleges this year, as follows: Hannover, 463; Berlin, 345; Munich, 258; Leipzig, 153; Giessen, 146. In addition to the 1,365 regularly enrolled veterinary students, 79 others are registered for special work.

Abstracts.

[Investigations on Bang infection in Man and in the Domestic Animals in certain Agricultural Districts of White Russia. Makkawejsky, W. N., *et alia*. *D.T.W.*, 1931, 39, 6, 86-88.]

Cattle.—In 28 districts, 1,049 cattle out of 3,255 reacted positively to the agglutination test (1-100 and higher). *B. abortus* was isolated in the milk of 14·7 per cent. of 68 infected cows.

Horse.—In certain large areas, in which the horses live in close contact with infected cattle, positive agglutination has been demonstrated in 75 of 375 samples of horse serum examined. In these positively reacting animals swelling of the knee and fetlock joint was often noticed. Sometimes there was lameness without apparent cause, sometimes suppuration on the head, neck and body, rapid tiring after work, weakness and cough. The infection of the horse begins with lengthy contact with infected cattle, particularly those suffering from purulent metritis.

Swine.—Of the sera of 68 pigs in seven districts, 14 were positive to the agglutination test at 1-100, 37 at 1-40 and 13 at 1-10; 13 cows aborted and in one instance *B. abortus* was isolated from the fœtus. In one farm 14 cows affected with metritis after abortion stood in a byre separated from 30 young sows and boars by a low grid-like partition, so that urine and fæces had access to the pig house. In addition, the swine were fed on raw milk. After eight weeks contact the sera of 17 sows agglutinated Bang's bacillus, four at 1-1,000 and 13 at 1-40.

Man.—In districts in which contagious abortion was prevalent the sera of 26 of 354 men had an agglutination titre of 1-100 to 1-800. The tests were carried out chiefly with the blood of veterinarians, milkers, herdsmen, etc. Of the 26 positive sera, 19 were from women and seven from men. The symptoms of some of these included headache, insomnia, rheumatism-like pains, intermittent fever and shivering.

J. H. M.

[The Establishment of Pregnancy in the Mare by the Demonstration of Ovarian Hormone in the Urine. Kust, *D.T.W.*, 1931, 39, 33-39.]

In the pregnant human female, anterior pituitary and ovarian hormones are excreted in the urine. The injection of such urine into young virgin female mice evokes changes in the ovaries and the generative organs, such as are seen in normal "heat." The pituitary hormone has its chief effect on the ovaries, petechiæ, hyperæmia, corpora lutea atretica being produced. The ovarian hormone has its effect upon the uterus and vagina without affecting the ovaries. Its injection produces the same changes, especially of the vaginal mucous membrane, as are seen in ordinary heat.

Experiments with urine from pregnant mares failed to reveal anterior pituitary hormone, or such small amounts were detected as to make the test of little practical value. However, it was shown the ovarian hormone was excreted in large amount. A mouse unit of ovarian hormone is that amount capable of producing in a virgin mouse, true œstrum.

Summary.

(1) One c.c. of urine of non-pregnant mares (but which may have previously been in foal) and of virgin mares contain, in the between heat period, no demonstrable ovarian hormone.

(2) This hormone could not be shown to be present in the urine of nymphomaniacal mares.

(3) During the œstral period, one c.c. of urine may contain up to one unit of hormone.

(4) Four days after foaling or abortion, it is no longer demonstrable.

(5) With advancing pregnancy, the amount of hormone increases in the urine. In the first five weeks the excretion is small and does not always reach one unit per c.c. From the sixth to the tenth week up to two units may be found and from three months onwards from 2-7 units may be demonstrable.

(6) A mare may be assumed to be non-pregnant if two months after the last service less than 0·5 units are present and after a further two months, *i.e.*, four months in all, less than one unit is found.

J. H. M.

[The Transmission of Avian Tuberculosis to Human Beings and the Occurrence of Tubercle Bacilli in Hen-eggs. Klimmer, M., 1930. *B.T.W.*, xxxxvi, No. 40, pp. 702-710.]

After reviewing at some length the literature on the subject and describing in great detail his own experiments, the author gives a long summary of his conclusions, from which we may quote some more important points.

Post-mortem examinations carried out in Germany revealed that 7 to 15 per cent. of hens, 6-7 per cent. of turkeys, 3 per cent. of pigeons, about 1 per cent. of ducks, ·7 per cent. of geese, ·8 per cent. of canaries, and about 33 per cent. of parrots were affected by tuberculosis. Avian tuberculosis is transmissible to other domesticated mammals. It has been found that 20 per cent. of cases of tuberculosis in pigs in Germany were of avian origin. Horses, cattle, and sheep are also susceptible. Avian tuberculosis can be transmitted to human beings, and there are three authentic cases recorded in literature. According to German investigators from 3-7 per cent. of commercial eggs and about 11 per cent. of eggs produced by tuberculous liens are infected with tubercle bacilli. If such eggs are placed in an incubator, the chicks hatched out from them may produce the infection in a hitherto tuberculosis-free flock. The paper has appended a list of more than a hundred references.

H. F.

Newcastle-upon-Tyne's Animal Dispensary.

At the recently-held annual meeting of the Newcastle-upon-Tyne branch of the Royal Society for the Prevention of Cruelty to Animals, Sir Francis Blake, President, according to the *Newcastle Daily Journal* "pointed out that the Animals' Dispensary, where Mr. Elphick was doing such valuable work, was the best of its kind in the country."

The Newcastle Dispensary, as our readers have been made aware from printed reports of its work, provides an outstanding instance of the value of local co-operation between members of the profession and the R.S.P.C.A. in the treatment of the sick animals of poor persons.

Colonial Veterinary Service Reports.

[**Kenya: Annual Reports of the Chief Veterinary Officer and of the Chief Veterinary Research Officer, 1929.** Included in the Report of the Department of Agriculture, pages 97-417. Nairobi, Government Printer. Price 5s.]

Stock Census.

Cattle.	*Sheep.*	*Goats.*	*Equines.*	*Pigs.*	*Camels.*
3,500,000	2,800,000	3,685,000	40,200	17,700	60,000

Staff.

The Chief Veterinary Officer (Major H. Brassey Edwards) directs the activities of 16 veterinary officers, and 29 stock instructors and stock inspectors. The Chief Veterinary Research Officer (Mr. J. Walker) is assisted by four Research officers at the Laboratory. Of the latter, Mr. Mettam has now been transferred as Veterinary Pathologist to Uganda, and Dr. Whitworth to the same office in the Gold Coast, their places being taken by the transfer of two officers from the field staff. The office of Deputy Chief Veterinary Officer remained unfilled.

Lieut.-Colonel Doherty, M.C., retired from the post of Chief Veterinary Officer during the year.

Research.

Investigations were continued into rinderpest, East Coast fever, horse sickness, Nairobi sheep disease, and plant poisoning, of which abstracts from the contained reports will appear later. Notable advances were made in the use of splenic extract as a vaccine against rinderpest, and the enquiry into the titre of various anti-rinderpest sera was continued. An inactivated spleen extract prepared from horse sickness by Dr. Whitworth was employed with very successful results.

Laboratory Routine.—(*a*) Diagnosis. Specimens numbering 6,330 were examined during the year.

(*b*) Sera and vaccine production. The following is a list of the more important preparations:—

Rinderpest serum	513,555 doses.
Rinderpest vaccine	15,921 ,,
Anthrax vaccine	17,626 ,,
Blackquarter vaccine	29,708 ,,
Pleuro-pneumonia vaccine	53,464 ,,
Laikipia lung disease vaccine ...	41,054 ,,

The value of these products was £43,222.

Disease Control.

Rinderpest.—Very little eradication was possible in the Native Reserves, partly owing to shortage of staff, and also, in some areas, owing to a disinclination of native owners to pay the inoculation fees.

In the settled area most demands for inoculation were made, and 85,067 cattle were immunised. Cattle to the number of 65,330 were immunised at Quarantine Stations and in Native Reserves. The total mortality was 1·5 per cent., most of which was due to intercurrent infection with redwater, to guard against which special precautions are necessary in the area where dipping is practised. A recent improvement in technique for the destruction of *Babesia* in spleen pulp has proved most valuable in this connection. Vaccination against this disease was carried out on several thousand cattle without any untoward result.

Bovine Pleuro-pneumonia.—The disease is still prevalent in several Native Reserves, but appears well under control in the settled area, only four outbreaks being reported. The issue of vaccine is now free, and settlers are urged to maintain the immunity of their stock.

Tick-borne Diseases.—The position in regard to these is described as menacing, but the recent passing of a Cattle Cleansing and Fencing of Holdings Bill now affords the Department means of effectively preventing spread, particularly in regard to East Coast fever. Heartwater is on the increase, but the *Amblyomma* can be controlled by dipping cattle at seven day intervals in a fourteen-day strength solution, and by the use of a hip-bath dip for sheep.

Immunisation against redwater and anaplasmosis is being continued, and is applied to cattle imported under the assisted passages scheme of the Empire Marketing Board. Forty-six such animals were imported during the year.

Anthrax is widespread: it is claimed that not enough use is made of vaccination against this disease.

Rabies.—One case is recorded.

Public Health.

Meat Inspection.

	Slaughtered. Nairobi.	Mombasa.	Condemned at Nairobi.
Cattle	12,154 ...	6,296 ...	1,075
Sheep and goats	25,657 ...	19,043 ...	301
Pigs	1,412 ...	— ...	7

Only one case of tuberculosis was diagnosed in Kenya during the year. Reference has already been made to the prevalence of anthrax.

Pasturage.

In some Districts there has been a marked shortage of grazing, due partly to an irregular rainfall and partly to the native owners' custom of over-stocking the available pasture. Many cattle died from starvation and lack of water, some herds losing as much as 75 per cent. from these causes. The grass is sparse and burnt and in many places soil erosion has taken place to such an extent that it is doubtful whether the grazing will ever recover. Large areas require resting for a number of years.

In the Machakos Native Reserve, which is estimated to be capable of carrying 54,000 cattle, there are actually 246,000 cattle and over 300,000 sheep and goats. It is now realised that this surplus can only be removed by the establishment of works for the preparation of such by-products as this class of scrub animal is capable of yielding, and efforts to this end are being made.

The Rowett Research Institute of Nutrition, Aberdeen, is continuing investigation into pasture deficiency, and is now conducting, in collaboration with the Kenya Government, experiments to demonstrate the commercial management of stock under local conditions, as well as into the rectification of loss arising from natural deficiencies of minerals there. [*Vide* accompanying report—Ed.]

Genetical.

Seventy-one pure-bred bulls and 48 cows were imported during the year: also 58 rams and 34 ewes. These consisted of several diverse breeds, dependent upon the whims of the owners. No systematic breeding experiments are in progress, except that a commencement with sheep was made in 1928 at one of the veterinary training centres.

Industrial.

A study of the native cow has been commenced at another veterinary centre, where milk and butter fat records are maintained, and attempts are being successfully made to demonstrate better methods of husbandry and calf rearing. The results strikingly show the value of these animals and how well they respond to proper management.

Both the dairy and the pig industries show definite advances during the year.

Steps for the improvement of hides and skins have been further considered. The value of the exports of these was £337,000.

Animal products amounting to £37,000 were imported, the most important item being condensed milk.

[**Sixth Report of the Committee on the Mineral Content of Natural Pastures. The Influence on Animal Health of Minerals in Diet.** H.M. Stationery Office, 1931. pp. 66. Price 1s.]

This Report gives the results obtained in Kenya up to 1929 by workers of the Rowett Institute under the direction of Dr. J. B. Orr, in collaboration with several stockowners and local officials.

The importance of the results achieved has caused the Government of Kenya to bring about a continuation, until the end of 1932, of those aspects more particularly bearing upon their practical application and the betterment of animal husbandry.

Composition of Pastures (Chemical).

Compared with British cultivated pastures, those of Kenya selected for these experiments were very deficient in sodium and less so in chlorine. At one centre the other mineral constituents were as plentiful as in Britain, but at the other three phosphorus, nitrogen, calcium, and potassium were all deficient. The soils showed the same deficiencies. Mineral shortage is especially marked in the grasses at the end of the dry season, but the content rises with the onset of the rains. The greatest shortage is that of phosphorus.

The application of fertilisers increased the yield of grass by as much as 400 per cent.: such plots remained vigorous and green for longer than the untreated areas, and stock instinctively preferred to graze on these treated lands.

Feeding with Mineral Supplements.

(*a*) *Dairy Cows.*—On phosphorus-deficient areas the feeding of bone meal and salt (calcium, sodium, phosphorus, chlorine) increased the milk yield by about 40 per cent. and the cows remained in better condition.

(*b*) *Sheep.*—The provision of minerals produced an increase of 10 per cent. in the weight of lambs; and an increase of over 30 per cent. resulted from the feeding with protein in addition to minerals.

There was an increase of from 5 to 10 per cent. in the weight of the wool, without any deterioration in quality.

Experiments were undertaken to ascertain whether the improvement due to feeding supplements had any effect upon worm infestation. The numbers of animals were rather too limited for deductions to be drawn, but there was a considerable diminution of infestation between those receiving minerals and the control sheep; and neither parasites nor ova were found in the fæces of those receiving both minerals and protein.

N.V.M.A. Divisional Reports.

Southern Counties Division.*

Annual Meeting in London.

The Annual General Meeting of this Division was held, by permission of the Principal (Professor F. T. G. Hobday) at the Royal Veterinary College, Camden Town, London, on Friday, March 27th, and was followed by some interesting demonstrations and surgical operations. A special general meeting was also held previous to the annual meeting to consider a suggested alteration to the rule fixing the time and place of the annual meeting.

The retiring President, Mr. H. C. Rockett of Salisbury, was in the chair, and the others present included Professor Hobday, Professor G. H. Wooldridge, Miss Cust and Messrs. John Facer, G. N. Gould, J. W. McIntosh, C. Pack, C. Roberts, Lieut.-Colonel P. J. Simpson and a number of the students of the College.

In introducing the business of the special meeting, the President explained that at present the annual meeting, according to their rules, must be held in March and in London, and the alteration proposed was the deletion of the words "and in London."

Mr. McIntosh remarked that he, personally, was in favour of the alteration, as he thought it would give them much greater latitude.

Lieut.-Colonel Simpson also approved of the alteration for the same reason.

Mr. Facer remarked that he could not say he was altogether in favour of it, but his only objection was the fear that they might lose the interest of some of their London members. They had not many, but they were all very staunch supporters of the Society and attended when they could.

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* Received for publication April 13th, 1931.

The Disease Nakuruitis.

In an area near Nakuru cattle commence to lose condition after six to eight months. There develops a stiffness, lack of co-ordination and anæmia, followed by progressive emaciation and death in a further two to four months if not removed from this pasture. As many working oxen are used in this locality, the importance of balancing the available grazing is obvious.

Between November, 1926, and October, 1927, the following experiments were concluded:—

(*a*) Controls. Twenty-six animals. *Result*: An average *loss* in weight of 33 lbs. each. Five animals died.

(*b*) Twenty-eight animals had the choice of access to three different licks, each containing 1 per cent. of iron. *Result*: Average *loss* 10 lbs.

(*c*) Twenty-seven animals were allowed each four ounces of a mixture: bone meal, 160 parts; potassium carbonate, 90 parts; ferric oxide, 20 parts. *Result*: an average *gain* of 55 lbs.

(*d*) Twenty-seven animals allowed access *ad lib.* to a mixture: ferric oxide, 50 parts; salt, 50 parts. *Result*: an average *gain* of 126 lbs. The actual consumption of lick was roughly 1 oz. per head *per diem*.

Mr. McIntosh: "I do not think you need fear that."

Mr. Gould observed that the annual meeting should be the most important and they therefore wanted to cater for as many of their local members as possible. How could they possibly do that if they had always to meet in London? The number they had there that afternoon was an indication of the attendance they had when they came to London and he thought they would be bound to have more if they met in a more central place.

The President agreed with Mr. Gould that it would be better to have more latitude, but he did not see they were necessarily bound to get a larger attendance. They had only seven at Winchester the previous year.

To bring the question to a definite issue, Mr. Gould proposed the deletion of the words suggested. The proposition was seconded by the President and carried.

The Annual General Meeting then commenced and the minutes of the previous meeting, as published in the *Veterinary Record,* were, on the proposition of the President, taken as read and confirmed.

Apologies for inability to be present were announced from Messrs. E. Whitley Baker, W. Caudwell, E. S. Martin, G. P. Male, G. Parr, W. F. Maynard and J. H. Ripley.

Hon. Secretary's Report.—The Honorary Secretary, in his report, stated that the last annual meeting was held at Winchester and since then they had held two very successful gatherings, one at Tidworth (at the invitation of Colonel Aitken) in the summer, and another at Christchurch, at which Professor Wooldridge exhibited a number of X-ray photographs and also gave a demonstration of the possibilities of the cinematograph. Three new members had been elected, but they had unfortunately lost one by death and another had resigned.

Replying to a question by Colonel Simpson, Mr. Facer said he believed their present membership was about 37. The list had been very rigorously pruned during the past year, with the result that a number of names had been struck off, but they could take it that the present list was really an authentic one.

Hon. Treasurer's Statement.—The Hon. Treasurer's statement was the next business on the agenda, and Mr. Facer mentioned that Mr. Whitley Baker had written him that he was afraid that the journey to London would be too much for him, but that he was enclosing copies of the balance sheet up to the end of December. This, Mr. Facer said, showed a credit balance of £64 3s. 6d., or about the same as that brought into the account from the previous year, but owing to their last meeting having been held in January instead of in December there were one or two outstanding liabilities which had since been paid and which would reduce the balance by about £8. In his letter to him Mr. Baker wrote that they would see the Society still had a comfortable balance. He was sending the usual two guineas to the Victoria Veterinary Benevolent Fund and he would be glad if that meeting would see its way to vote an additional ten guineas this year. Mr. Baker also tendered his resignation as Hon. Treasurer.

Mr. McIntosh thought they should send their sympathy to Mr. Baker in the cause of his absence that day and also their regret that he felt he must resign the office he had held for so many years. With regard to the subscription of two guineas to the Victoria Veterinary Benevolent Fund, he saw from the balance sheet that they sent four guineas last year and he would like to see them send four guineas this time and consider the making of a donation of ten guineas, in addition.

Mr. Facer said he thought the £4 4s. sent last year represented two years' subscription.

Lieut.-Colonel Simpson, as Honorary Secretary of the Victoria Veterinary Benevolent Fund, said he could assure them that if they could adopt Mr. Baker's suggestion, the Fund would only be too grateful to receive the donation, and they could be quite sure the money would be well spent on really deserving cases.

Mr. Gould remarked that the only question that occurred to him was that the balance sheet they had before them was rather vague and that it would perhaps be safer to find out exactly how they stood before they made a donation of £10 10s.

Mr. McIntosh proposed that they send a subscription £4 4s. to the Fund this year, and Mr. Gould, in seconding this, said they could leave the question of making a donation over to their next meeting.

The proposition to send a subscription of £4 4s. and to defer the question of also making a donation to the next meeting, was unanimously carried.

Election of Officers.

The election of officers for the ensuing year then followed.

President.—Major E. S. Martin, of Christchurch, the Vice-President, was, on the proposition of Mr. McIntosh, seconded by Mr. G. N. Gould, unanimously elected as President.

Vice-President.—Mr. Gould proposed and Mr. Facer seconded that Mr. J. H. Ripley should be asked to accept the office of Vice-President for the coming year.

Hon. Secretary.—With regard to the Honorary Secretaryship, the President said he was sorry to have to announce that Mr. Facer had definitely decided to tender his resignation, but Mr. G. N. Gould was, he understood, willing to succeed him and he had much pleasure in proposing the election of the latter.

Colonel Simpson seconded, and the resolution was unanimously agreed to, the President remarking that they were much indebted to Mr. Gould for coming forward.

Mr. Gould, in acknowledging his appointment, said he would do his best and he hoped he would be able to rely on the support of the retiring secretary and of the members generally. He would arrange meetings, and he asked the members to support him by attending and persuading the less enthusiatic members to do so as well.

The President thought they ought to place on record their appreciation of Mr. Facer's work as Honorary Secretary. Personally, he was very sorry he was resigning, but he had evidently quite made up his mind and they could not do other than bow to his decision.

Mr. McIntosh said he had much pleasure in supporting this. Mr. Facer had had a very difficult task in keeping things going, and unfortunately he had not been as well supported by some of the members as he should have been. He (Mr. McIntosh) only hoped his successor would be more fortunate in this respect, because members ought to be prepared to make some little sacrifice to attend the meetings when they were called.

The President's proposal was unanimously agreed to and Mr. Facer, in reply, admitted that he was giving up the

office with some reluctance, but Mr. Gould, being a younger man, would perhaps be able to put a little more energy into the part and meet with more success. He sincerely hoped he would do so and, so far as he himself was concerned, Mr. Gould could rely on his help.

Hon. Treasurer.—In connection with the appointment of Honorary Treasurer, the President remarked that, as they had heard from his letter, Mr. Whitley Baker wished to be relieved of the office, and in view of the fact that he was not enjoying the best of health he was afraid they would have to accept his resignation, although he was sure they would do so with great regret. It had been suggested that it might be advisable to combine the office of Honorary Treasurer with that of Honorary Secretary, at all events for the time being.

Colonel Simpson supported this suggestion and proposed that Mr. Gould be also appointed Honorary Treasurer.

This was seconded by Mr. McIntosh and unanimously carried.

It was also resolved that the necessary steps be taken to transfer the Society's banking account from the National and Provincial Bank at Wimborne to Lloyds Bank, Avenue Branch, Southampton, and the President, as Chairman of the meeting, was authorised to sign a copy or copies of this resolution for submission to the respective banks.

Hon. Auditors.—Messrs. H. C. Rockett and J. Facer were appointed honorary auditors. *Executive Committee.*—Messrs. R. E. C. Bullen, W. F. Maynard, C. Pack, C. Roberts and J. B. Tutt were re-elected.

Representatives to Council N.V.M.A.—The President and Honorary Secretary were appointed.

A hearty vote of thanks was accorded to the retiring President for his services.

Operations and Demonstations.

The members were then invited to inspect the Museum and to witness a number of surgical operations and demonstrations, which had been arranged for them by Professor Hobday and the staff of the College.

In the Canine Operating Theatre Professor McCunn performed a metrectomy operation on a terrier bitch with chronic metritis and Cæsarean section on a case of dystokia in a Pomeranian. Professor G. H. Wooldridge demonstrated on a case of persistent inflammation of sinuses in a hunter. Professor Wright operated on a cat's eye for hypopyon, using Avertin anæsthesia, and spayed a bitch under chloroform anæsthesia. Mr. Ede demonstrated with his new up-to-date portable X-ray apparatus and took X-ray photographs of ringbone in the horse. Professor Hobday himself directed the attention of the visitors to some cases of severe fistulous withers and one quite inoperable case of osteo-sarcoma of the lower jaw of a yearling Shire colt.

Tea was afterwards served in the Canteen, and before leaving Mr. Rockett conveyed the thanks of the members to Professor Hobday and to the Professors who had performed operations or given demonstrations that afternoon.

G. N. Gould, (Junr.), *Hon Secretary.*

In Kenya (Africa) the *Bunostomum trigonocephalum* (a namatode) is the most serious parasitic pest of sheep.

Western Counties Division.*

Annual Meeting at Exeter.

The 47th annual general meeting of the above Division was held at the Rougemont Hotel, Exeter, on Thursday, March 19th, 1931. In the absence of Major Wright (the President), owing to illness, the Chair was taken by Major Fyrth.

The following members were also present: Messrs. Percy, R. E. L. Penhale, E. J. Thorburn, G. D. Lansley, J. M. Penhale, H. B. Kauntze, L. W. Bovett, R. H. Smythe, H. Fraser, J. K. Irvine, C. Masson, L. Norman, R. Glave Saunders, W. B. Nelder, H. Keeling Roberts, J. Willis Thwaite, E. R. Edwards, R. H. Penhale, R. Barons Nelder (Hon. Treasurer) and S. J. Motton (Hon. Secretary).

The minutes of the previous meeting were read, approved and signed.

Apologies for absence were read from Professor Hobday, Major Dunkin, Major Wright, Major James, Major Ascott, and Messrs. Crowhurst, Stephens, Harvey, A. G. Saunders, Smythe (Falmouth), Roach and Wilshaw.

Correspondence.—A letter was read from Major Dunkin thanking the Division for electing him as an Hon. Associate, and expressing the hope that he might find an early opportunity of visiting the Division and thanking the members personally.

Mr. Conisbee, of Axminster, wrote tendering his resignation, on account of his leaving the district.

Reports.

The Hon. Secretary presented his annual report, in which he expressed his thanks for the generous help he had received during the year from everyone, and especially to the President, Hon. Treasurer, and the gentlemen who so kindly helped to make the meetings a success by producing papers, clinical cases, specimens, etc. He remarked that during the year the representatives of the Division on the Council of the N.V.M.A. had made visits to London for the purpose of attending meetings of Council, and of the Committees to which they were elected. Owing to the distance, it had not been possible to attend all of these meetings, and he wondered if Council would consent to such members acting for each other on the committees, when one or the other found it impossible to get to London.

The Hon. Treasurer presented his annual report, which showed a satisfactory financial position. The membership roll was similar in number to that of last year; two new members had been added, but two old and valued members —the brothers Dunstan—had been removed from their midst by death. A copy of the accounts had been sent with the notice of the meeting, and they had been carefully audited by Mr. E. R. Edwards as usual. Mr. Nelder moved the adoption of the report and balance sheet.

The motion was seconded by Mr. Masson, and carried unanimously.

Election of Officers.

President.—It was proposed by Major Fyrth and seconded by Mr. R. H. Smythe that Mr. H. W. Townson,

* Received for publication April 7th, 1931.

of St. Austell, be elected President for the ensuing year. The proposition was carried unanimously.

Vice-Presidents.—On the proposal of Mr. J. M. Penhale, seconded by Mr. Kauntze, the following were elected Vice-Presidents:—Major Wright, Messrs. F. T. Harvey, H. Keeling Roberts and E. C. Bovett.

Council of the Division.—On the proposal of Major Fyrth, seconded by Mr. Kautze, the following were elected:—Messrs. J. M. Penhale, E. R. Edwards and E. C. Bovett.

The *Hon. Treasurer* (Mr. R. B. Nelder), *Hon. Auditor* (Mr. E. R. Edwards) and the *Hon. Secretary* (Mr. S. J. Motton) were re-elected.

Representatives to Council, N.V.M.A.—The following were elected:—The President (Mr. H. W. Townson), Messrs. R. B. Nelder and S. J. Motton.

The County Secretaries were re-elected, *viz.*:—Devon (Mr. R. B. Nelder), Dorset (Major Fyrth), Somerset (Mr. A. G. Saunders) and Cornwall (Mr. S. J. Motton).

Place of Next Meeting.—On the proposal of Mr. R. B. Nelder, seconded by Mr. H. K. Roberts, it was decided to hold the next meeting at Plymouth at the end of June, the fixing of the actual date being left to the Hon. Secretary.

Nominations for Membership.—Mr. Peter Fisher was nominated by Mr. R. B. Nelder, seconded by Hon. Secretary.

Mr. Crowhurst, Junr., was nominated by the Hon. Secretary, seconded by Mr. R. B. Nelder.

"Strongylidiosis in Equines."

Mr. J. Willis Thwaite, B.V.Sc., M.R.C.V.S., D.V.H., read a very interesting paper on "Strongylidiosis in Equines." The essayist requested that the paper be not published for the present,. and only a summary of the opening, discussion and reply are therefore being reported.

The discussion was opened by Mr. R. H. Smythe, of Camborne, who expressed to Mr. Thwaite his thanks for a very interesting paper, and congratulated the essayist upon so soon making the value of his presence in the Division very evident.

He said that Mr. Thwaite had devoted a good deal of the paper to the life history of *S. equinus*, and he was sorry that there was not a little more generalisation, for two reasons: (1) this strongyle was not the most common strongyle of the horse, and it was not usually credited with producing one of the most serious results, *viz.*, aneurism, which by Looss and other workers, was attributed solely to *S. vulgaris*, and (2) because almost every apparently normal horse, and practically every horse known to be infected with strongyles, harboured a varied assortment of nematodes, so that from a purely clinical standpoint, it was impossible to view any species independently.

Owing to the life history of the parasites, infection usually occurred at night, or early in the morning, whilst the grass was still damp; also, infection was more probable and more severe in winter when grass was short, than in spring or summer. This might account for the belief that the best treatment for emaciated horses was to turn them out by day on seeds. He had observed severe outbreaks in stables of horses fed on hay grown on strongyle-infested pastures. In practice one found that there was no fixed ratio between the degree of infection and the visible result of that infection. He asked if the essayist could provide any explanation for the apparent immunity which a large proportion of horses appeared to possess, and if he associated the clinical symptoms with mechanical interference with bowel utility or with the absorption of toxins?

Did Mr. Thwaite place any reliance on lime, salt or copper sulphate for the sterilisation of pastures?

He had, on one occasion, tried grazing sheep after infected horses, and the sheep became unthrifty. He made no attempt to explain this, as a variety of causes might have been in operation.

The disposal of stable manure was of importance, and he asked for information as to the development of larvæ and their ultimate fate in a pile of stable manure.

Mr. Thwaite had asked if any drug could influence encysted larvæ in the bowel wall. His reply was "Why try"? In the normal course of evolution they would complete their life cycle in a month, and treatment should be directed to the removal of adult parasites, and the prevention of re-infection. Hall had proved the value of a 36-hours' fast before dosing with chenopodium, half an ounce of which was followed by a quart of linseed oil two hours later. Mr. Smythe thought it dangerous to allow farm hands to administer linseed oil, with or without the addition of vermicides. Personally, he gave two to four drachms of oil of chenopodium made into balls with linseed meal and soft soap, followed shortly after by a full dose of aloes. This treatment was inapplicable when persistent diarrhœa was present, and when marked œdematous swellings were present.

Major Fyrth thought that perhaps lime was used more freely when lime kilns were more numerous, and that in those days one heard less of parasitic troubles in horses. In connection with prevention, he thought we should advise the use of lime and salt, and the keeping of horses off infected pastures for from six to twelve months. He thought stagnant ponds were dangerous.

Mr. Fraser remarked that over-stocking with horses and poor feeding were the chief pre-disposing causes. As to the treatment of pastures, he believed nothing short of ploughing was of any use.

Mr. Keeling Roberts asked if the essayist thought that all cases of horses with œdematous swellings were due to strongyles, or if he thought that bots also played a part in connection with them. Good feeding kept horses fit and prevented the exhibition of symptoms, and animals on good land showed no apparent infection.

Mr. R. H. Smythe, referring to the treatment of these cases with arsenical preparations, said that horses were severely affected with strongyles on land of which he knew, and that this land was so dangerous from the presence of finely divided arsenic, that insurance companies would not insure animals grazed thereon.

Mr. Thwaite, in the course of his reply, said he was sorry that some discussion had not arisen in connection with the relation of aneurisms to colic. There was a feeling that colic was caused by the verminous aneurisms cutting off the blood supply to a part of the bowel.

Horses which were not out might be expected to be free from strongyles, but he thought it was Professor Hobday who had said that London 'bus horses used to

be infected with strongyles. Hay was suspected as carrying the infection, and that was astonishing, as hay was dry and the larvæ would not live long when dry—larvæ died in dry hard fæces.

It seemed common sense to plough infected pastures, but experimental confirmation of the effectiveness of this appeared to be lacking. It was conceivable that if dung were ploughed in, and corn or seeds cut next year, eggs might hatch in the soil, larvæ might crawl up the seeds or corn, and that they might be alive when the crop was cut.

As to the cause of unthriftiness, he thought it was due to changes in the bowel wall, as a result of which the products of digestion were not properly absorbed. The larvæ remained in the bowel wall for some time, and there was a big reaction, probably twenty times the size of each larvæ. When this occurred with thousands of larvæ there must be very considerable interference with the function of the bowel wall. He knew of no experimental evidence which would lead to a definite conclusion as to the effect of copper sulphate in connection with the destruction of strongyle infection in pastures.

He thought that if the larvæ were killed in the bowel wall, they would degenerate, and lead to less structural change in the wall, and he wondered if the feeling that arsenic was of value in these cases, depended on any action on larvæ in that situation.

He had been asked what was the shortest time in which symptoms might be shown after the ingestion of larvæ. He thought in one or two weeks, and certainly in a month.

As to the safe dose of carbon tetrachloride, the average hunter should stand eight to twelve drachms.

With regard to the resistance of some horses to infection, they probably developed immunity with increasing age, in the same way as dogs did to ascarides, but why some colts appeared to be immune he did not know.

The meeting closed with a very hearty vote of thanks to the essayist for reading the paper, and to Major Fyrth for occupying the Chair.

S. J. Motton, *Hon. Secretary.*

Meat Inspection in England.

"The Value of Meat Inspectors" was the subject introduced for discussion by Major D. S. Rabagliati (chief veterinary officer to the West Riding County Council) at a sessional meeting held at Batley Town Hall on May 2nd in connection with the Royal Sanitary Institute.

Our live stock, he said, were always said to be, and truly so, the envy of the world, yet in England our methods of examination of this stock, when it was intended for slaughter and of the meat derived from it, were lamentably behind those of many other nations.

There were towns, large and small, and even some urban and rural areas where meat inspection was of a very high order and facilities for slaughter up-to-date, but they were few and far between.

Were not we in England said to be proud of the "Roast Beef of Old England," but were we keeping it up to its reputation? He sometimes wondered.

One of the greatest stumbling blocks to a better and more uniform system of meat inspection in England to-day was the presence of so many private slaughter-houses.

While fully recognising the financial and other difficulties which closing down would entail, they would have to be closed sooner or later, and the sooner the better.—*Yorkshire Evening News.*

North of Ireland Division.*

Annual Meeting at Belfast.

The annual general meeting of the above Division was held in the Imperial Hotel, Belfast, on January 28th, 1931, at 7.30 p.m.

Prior to the meeting the members met for tea in the hotel.

The President, Mr. H. M'Connell (Armagh) occupied the Chair, and the following members were also present:—J. I. Magowan (Hon. Secretary), H. C. I. Kelly (Hon. Treasurer), H. G. Lamont, T. Finch, A. Monro, J. Kernohan, W. G. Clarke, W. J. Jones, R. W. Cassells, W. R. Henry, H. Jewell, W. Dunlop, H. D. Gilmore, W. Ashe King, F. W. Hart, F. Russell, R. Moore, W. F. Huey, J. Thompson, H. L. M'Connell, A. M'Farlane and A. M'Lean. *Visitors*: T. Y. Ranson, A. Spreull, G. Clerkin, G. F. Timoney, and J. B. Caruth.

Apologies for non-attendance were received from F. W. Emery, J. Ewing Johnston, W. P. Walsh, and R. S. Kyle.

President's Review.—The President, in his opening address, reviewed the work of the Division for the past year, stating that three general meetings and four Council meetings had been held in 1930. The attendance had been the best in the history of the Division, and the interest taken by the younger members augured well for the future of the Division and profession in general in Northern Ireland. Members, realising the benefit of such meetings socially as well as professionally, were now taking a fuller advantage of the benefits of their Division. The year, said Mr. M'Connell, had been a very black one for the profession in that, during it, they had lost five members of the Division as well as two other members of the profession in Northern Ireland—he referred to the deaths of Messrs. M'Aleer, Kyle, R. Kernohan, Geo. Wilson, and R. Ewing Johnston—members—and of Messrs. Smyth (Dromore) and Chambers (Banbridge).

In proposing a vote of condolence, the President made special reference to the loss sustained by the Division, in the death of Mr. Geo. Wilson, and Mr. R. Ewing Johnston, two brilliant men professionally and ardent supporters of the Division, to whom the older members had looked as having a future of great influence for the good of all members. Their untimely demise had cast a gloom throughout both the profession and the public in general in Northern Ireland, where both were so well known and loved. This vote was passed in silence, the members standing.

Minutes.—The President then called upon the Hon. Secretary (Mr. Magowan) to read the minutes of the two previous meetings, these being passed, on the motion of Mr. Moore, seconded by Mr. Huey.

Correspondence.—A letter was read from the Secretary, N.V.M.A., asking that a Committee be formed to further the membership in the Association's area. Mr. Magowan mentioned that 53 per cent. of members in Northern Ireland were members of the N.V.M.A. While this compared favourably with other areas, there was ample room for increase and he proposed that a Committee be formed to give their help as requested. This was duly seconded

* Received for publication, April 22nd, 1931.

and passed unanimously, the following Committee being elected: The President, Hon. Secretary and Hon. Treasurer.

A communication from Mr. Snodgrass, Strabane, was read, extending an invitation on behalf of the North-West Members to hold the next meeting in Derry City. After considerable discussion it was decided to hold the meeting in Derry, the Hon. Secretary to consult with the North-West members as to the most suitable date, and to make the necessary arrangements for the meeting.

Treasurer's Report.—This was submitted by the Hon. Treasurer, Mr. H. C. I. Kelly, who intimated that the Division was in a sound financial position. The adoption of the report was proposed by Mr. T. Finch, seconded by Mr. A. Monro, and carried unanimously.

New Members.—Mr. H. C. I. Kelly proposed and Mr. J. I. Magowan, seconded that Rule 3 be suspended for this meeting prior to the election of the following:—Messrs. J. R. Kellett, T. Y. Ranson, A. Spreull, and A. Thompson.

Election of Officers.

President.—Mr. W. S. Lamont, Cookstown. Proposed by Mr. H. M'Connell, seconded by Mr. Hart.

Vice-Presidents.—Mr. J. Gault, Ballymoney; Mr. J. Loughran, Aughnacloy.

Council.—Messrs. F. W. Emery, A. Monro, J. M'Lean, H. G. Lamont, F. Russell, J. Ewing Johnston and T. Finch.

Hon. Treasurer.—Mr. H. C. I. Kelly.

Hon. Secretary.—Mr. J. I. Magowan. Proposed by Mr. Jewell, seconded by Mr. Kelly.

Registration Fees.—On the President asking for any other business before proceeding with Mr. M'Clure's paper, Mr. H. D. Gilmore asked what was the position as regards registration fees payable by a member who, while domiciled in Northern Ireland, practised in the Irish Free State. An explanation of the position was given by the Hon. Secretary, Mr. Magowan, who was requested, on the proposal of Mr. W. Ashe King, seconded by Mr. Monro, to write to the Secretary of the Royal College to get definite instructions regarding the position and to intimate Dr. Bullock's reply to members.

N.V.M.A. Congress, 1931.—Mr. Kelly brought forward the matter of extending an invitation to the N.V.M.A. to hold the 1932 Congress in Belfast. After discussion, it was proposed by Mr. W. Ashe King and seconded by Mr. Kernohan that the matter be referred to the Council for decision.

Paper.—The President next called on Mr. T. B. M'Clure, Veterinary Officer, Kenya, to give a paper entitled "Work and Conditions in Kenya Colony." This instructive and humorous paper was appreciated very highly by all the members, who showed their pleasure by a hearty round of applause at its conclusion. Mr. Jewell and several other members requested Mr. M'Clure for further information on certain points which led to an augmentation of this very comprehensive paper. Mr. Jewell proposed a vote of thanks to Mr. M'Clure. This was seconded by Mr. Magowan, who said that the good spirit shown by Mr. M'Clure—a stranger to many of them—should be an example to members to produce the necessary material for such meetings. This vote of thanks was passed by acclamation.

Mr. Monro proposed a vote of thanks to the retiring President, who had now fulfilled his second term of office as President of the Division. This proposal was seconded by Mr. H. G. Lamont and carried, Mr. M'Connell making a suitable reply.

This being all the business, the meeting terminated.

J. I. Magowan, *Hon. Secretary.*

County Court Sequel to Swine Fever Outbreaks.

Before the Deputy Judge (Mr. W. Rowley Elliston), at the Woodbridge County Court, recently, Walter James Turtill, veterinary surgeon, Ashbocking, claimed £1 19s. from David Belsom, late of Burgh, and now of Churchpond Hall Farm, Capel Street, for professional services rendered defendant in connection with pigs.—Defendant admitted the claim up to £1 9s., disputing the balance of 10s., and counter-claimed £162 for damages sustained through the alleged negligence of Mr. Turtill and his assistant (Mr. R. J. Steel), as result of which a number of pigs belonging to defendant became infected with swine fever.—Mr. Gerald Howard (instructed by Messrs Turner, Martin and Symes) appeared for the plaintiff, and Mr. H. S. Gotelee (Messrs. Gotelee and Goldsmith) for the defendant, Mr. Turtill.

Mr. Howard stated that plaintiff abandoned the 10s., balance on the claim, and therefore the defendant was really in the position of a plaintiff in his claim for damages.

Mr. Gotelee then opened defendant's case against the plaintiff. He read the regulations imposed by the Ministry with regard to the instruments used where swine fever was concerned—the washing of the hands in soap and water, disinfecting the instruments and the spraying of a disinfectant upon the boots. He would call evidence that defentant, or his assistant, had not only neglected to carry out these instructions in the present case, but had habitually done so in other places where swine fever had broken out.

Defendant having given evidence, Dr. A. L. Sheather said he thought it unlikely that swine fever was air-borne; it was a contagious disease. The bacilli would be killed by the disinfectants prescribed by the Ministry, and if the regulations were carried out would reduce the risk to a minimum. Swine fever would remain alive for some weeks, and it had been known to remain virulent up to three months. It was not a proper thing to wipe a knife after use, as it would not be disinfected.

And anyone using that knife subsequently would be likely to infect?—Quite possibly.

Witness added that clothing would carry the infection.

It can be carried in a hundred and one ways—by birds, rats, horses' feet?—Yes. Anything moving from one place to another can carry the virus with it.

In reply to a further question by Mr. Howard, witness said that the use of a dirty knife after operating upon swine fever infected pigs would most likely cause infection when used upon others.

Inspector Eade, of Woodbridge, stated that after Belsom had reported the outbreak, he told Mr. Turtill that it was alleged he had not used disinfectants either for his instruments or clothing. Mr. Turtill replied: "I took every precaution, the same as I always do; that is all I can say. My boots were cleaned before I left home that day. It was the first place we called at." Steel, his assistant, said: "I quite agree with what Mr. Turtill has said." Mr. Turtill added: "No one can be more careful than I."

Cross-examined, witness said he had seen lysol and a sprayer in Mr. Turtill's dispensary.

At the conclusion of the case for the defendant, Mr. Howard submitted to the Judge that the evidence had not affirmatively proved that the damage sustained by Belsom was the direct result of negligence by Mr. Turtill. The defendant's own expert witness (Mr. Sheather) had stated that there were one hundred and one ways in which swine fever could be carried and cause infection.

Mr. Gotelee, in reply, argued that the evidence as to the neglect of the precautions necessary went to show that the disease in this way had been communicated to his client's pigs.

His Honour said he was against Mr. Gotelee. He did not think there was evidence before him that would justify him in allowing it to go to a Jury if they were trying the case.

This was a somewhat important matter, and he would, therefore, give his reasons for coming to that conclusion. On October 14th, Turtill was called in to perform these operations on the pigs, and it was alleged that he was guilty of negligence. It was due to the person alleging that negligence to prove it by affirmative evidence; it must not rest upon mere suspicion—there must be clear evidence that there was some act or some omission which resulted in the damage that ensued. The evidence of the defendant went to show that if there were any acts of negligence they were all after the operations were performed, and which did not affect the present issue. He (the Judge) was asked to say that Turtill was negligent because on some previous occasions there had been a course of conduct, but he must be satisfied that there was some shadow or suggestion that there was negligence in the performance of this particular operation. He had no evidence of any such negligence on October 14th. It was a remarkable fact that if, as alleged, Turtill had infected the pigs on this farm, there was evidence that on the same day he had at another farm used the same instruments, and no infection had resulted. He therefore gave judgment for plaintiff for the £1 9s., and judgment for Turtill, on the counter-claim, with costs.

Sydney University Veterinary Society.

The Sydney University Union *Recorder* of March 26th, 1931, states that the above was founded in 1912 under the Presidency of the Dean, Professor J. D. Stewart, who has been thrice President. "During the Great War activities were curtailed, since most of the members were serving abroad. With peace it began with renewed vigour, and the management of the Society passed entirely into student hands. Every President and Secretary since 1920 has been drawn from among the senior students, and the experience gained in these offices has proved invaluable to those who on graduation have passed into the wider fields of the New South Wales and Australian Veterinary Associations.

"Since its inauguration the Society has endeavoured to arrange such addresses from prominent men as would, primarily, keep its members in close touch with the broadest current scientific thought. Reviewing the Society records, one can honestly say that this aim has been achieved.

"Of recent years, particularly, students have been encouraged wherever practicable to read papers on subjects of their own choice, and active discussion is now becoming a normal feature. The advance of the profession in recent years has laid upon the veterinary graduate the responsibility of maintaining a very high scientific standard. That he shall become skilled in clear exposition is one of the first essentials. It is important, then, that freshmen bear this in mind and from this point of view, if from no other, learn to take advantage of the Society."

This year's office bearers are: *Patrons*—The Hon. the Minister of Agriculture; The Dean and Members of the Faculty. *President*—Mr. K. Bray. *Vice-Presidents*—Mr. S. P. Hebden; Mr. N. P. H. Graham, B.V.Sc. *Hon. Secretary*—Mr. H. Carter. *Hon. Treasurer*—Mr. R. Glider. *Hon. Graduate Secretary*—Mr. S. P. Hebden. *Executive Committee*—The President, the Vice-Presidents, the Hon. Secretary, the Hon. Treasurer, Mr. D. F. Stewart, Mr. C. King, Mr. D. Abbott.

A considerable proportion of anthrax spores kept dry at room temperature and exposed to diffused daylight are capable of germinating for a period of at least 10 years, and some spores retain their vitality under these conditions for a period of 23 years.

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

May 21st.—R.C.V.S. Voting Papers and Annual Report issued.

May 28th.—Last day for return of Voting Papers R.C.V.S. Council.

June 1st.—Meeting of the Editorial Committee, N.V.M.A., at 2 Verulam Buildings, Gray's Inn, W.C.1, 4.30 p.m.

June 4th.—**R.C.V.S. Annual General Meeting.** Victoria Veterinary Benevolent Fund, Annual Meeting.

June 15th-20th.—D.V.S.M. Examinations.

July 2nd.—R.C.V.S. Annual Dinner.

Aug. 22nd-28th.—N.V.M.A. Congress at Norwich.

Personal.

The Invalids.—Latest advices from the Hampstead General Hospital are to the effect that, though Professor Macqueen's operation wound is not yet healed, it is anticipated that the ex-President's prolonged stay will terminate within the next week or so.

We learn with equal satisfaction that Mr. H. J. Dawes, the Hon. Secretary of the N.V.M.A., of whose indisposition we recently informed our readers, is deriving great benefit from his stay at Bournemouth, though we regret to say that his health is still far from good.

. . . . .

Wills—Noar, Mr. William, M.R.C.V.S., of Bury, Lancs. (net personalty £1,829), £1,946.

Fearnside, Captain John Arthur, M.C., M.R.C.V.S., of Ballachulish, Argyll, hotel keeper (personal estate): £3,013.

. . . . .

Marriage.—On Tuesday, May 12th, 1931, Rachel Hall, only child of Richard Watson and Frances Lilian Hall, of Cockermouth, Cumberland, to Joseph Malcolm Armfield, second son of Aaron Ashby and Helen Penman Armfield, of Garth Steading, Chipstead, Surrey.

The Late Mr. James Devlin, M.R.C.V.S.

"Large numbers attended the funeral of Mr. James Devlin, M.R.C.V.S., whose death took place at his residence in Coalisland," says the *Irish News* of May 1st.

"The deceased was well known by many, and deservedly popular. A native of Coalisland, he was educated at St. Patrick's College, Armagh, and entered the University in 1908, and later qualified with honours as a member of the Royal College of Veterinary Surgeons.

"After his graduation he returned to Tyrone, where he practised till his death. Apart from his private practice he held a post for some years under the Dungannon Rural District Council.

"A touching tribute to the deceased was paid by Rev. P. Cush, C.C., in the course of an eloquent panegyic after the Requiem Mass. He described the deceased gentleman as a true member of the Mother Church to which he had been so devoutly attached during life.

"The funeral was representative of the clerical, professional and commercial classes of the county."

Army Veterinary Service.

London Gazette—War Office—Territorial Army.

May 8th.—Lieut. F. L. Haydon (late R.A.S.C.), to be Lieut. (May 5th.)

The Milk Supply.

Viscount Astor, who recently initiated a debate upon milk in the House of Lords, has amplified some of his remarks with a view to indicating steps that might be taken to improve the milk supply of this country. Essentially his advice is to empower progressive local authorities to go ahead. First he would like Parliament to simplify the milk designations scheme; after which local authorities should be empowered to compel all milk sold in their areas to be labelled in accordance with the designations. Viscount Astor hopes that in 15 years' time there will be only two grades of milk, the top one being, humanly speaking, absolutely safe.

Pig-Recording Research Grants Withdrawn.

It was stated, at a meeting of the Conservative Parliamentary Committee, that the Ministry of Agriculture proposed to cease making grants hitherto available for pig recording. The Committee expressed the opinion that this Government encouragement should not be withdrawn, and appointed a deputation to confer with the Minister.

It is understood that the grants so far made by the Ministry in connection with pig recording are those made to the East Anglian scheme, which has been directed by Cambridge University. This scheme, which has been running for four years, aims at finding the best means on which to found a system of recording pig litters in this country. In the ordinary way the grants end next September, and the Government has given notice that they will not be renewed.—*Farmer and Stockbreeder.*

Bees by Aeroplane.

The Paris correspondent of *The Times*, writing to his paper on May 7th, says:—

"As part of the freight carried by the Marseilles to Paris aeroplane yesterday were 10 hives of bees. It is not known whether this is the first occasion that bees have been thus transported, but it may well be the last.

"About half-way along the route the passengers noted several of the insects in the cabin and attacked them with newspapers. Fresh bees kept arriving, first in tens, then in hundreds, and finally in thousands, until most of the inhabitants of one hive which had been damaged had taken possession of the cabin. The passengers took refuge under shawls and handkerchiefs, but the unfortunate pilot, whose cockpit was invaded, could do nothing but stick to the controls, which he did with exemplary calmness, avoiding all unnecessary movement. He finished the journey with bees swarming all over him.

"On their arrival at Le Bourget the bees left the aeroplane in search of their queen. They finally found her in the broken hive and swarmed there, which made it possible for them to be given fresh accommodation without any difficulty. The total casualties of the occasion were no more than two or three stings."

Sex Predilection in Disease.

The predilection of the following diseases to attack men as compared to women, is (according to *Veterinary Medicine*, Chicago:—

Pneumonia, 50 to 1; Amæbic dysentery, 15 to 1; Diabetes, 3 to 2; Gout, 46 to 1; Gastric ulcer, 5 to 1; Sero-fibrinous pleurisy, 5 to 1; Pernicious anæmia, 2 to 1; Angina pectoris, 6 to 1; Alcoholism, 6 to 1; Tabes, 10 to 1.

The prevalence of the following diseases among women as compared to men, is:—

Influenza, 2 to 1; Gallstones, 4 to 1; Movable kidney, 7 to 1; Exophthalmic goitre, 7 to 1; Myxœdœma, 6 to 1; Migraine, 6 to 1; Hysteria, 7 to 1.

Hæmophilia is a disease of males exclusively and chlorosis of females only.

Horse Transport in London.

A deputation arranged and headed by the National Horse Association, and including numerous other organisations interested in horse transport in London, was received on May 8th, by a Sub-Committee of the London and Home Counties Traffic Advisory Committee, with regard to the proposed Oxford Street Draft Regulations, with particular reference to, and protesting against, the regulations affecting horse-drawn traffic.

H.M. Stationery Office Publications.

The under-mentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

	Price Net.	*Post Free.*
	s. d.	*s. d.*
Health, Ministry of:—		
Public Health and Medical Subjects Reports:—		
63. A Memorandum on Bovine Tuberculosis in Man, with Special Reference to Infection by Milk. March, 1931 (32-195-63-0)	0 6	0 7
Statutory Rules and Orders, 1931:—		
338. Animal. Order of the Minister of Agriculture and Fisheries, dated April 18th, 1931, amending the Animals (Importation) Order of 1930	0 1	0 1

Erratum.—In the Clinical Report by Mr. J. G. Hoban entitled "Tuberculous Spermatic Cord in a Gelding," published in our last issue (Page 542, Col. 1), for "May 18th," in para. 2, line 1, read "April 18th, 1931."

Pedigree Live Stock.—"Pedigree live-stock breeders in this country were not a little disturbed by the announcement made some time ago that the Argentine Government had decided upon a heavy increase in their import duties," says the *North British Agriculturist*. "Pedigree stock imports were to share in the higher duties and although later the Argentine Government agreed to modify the duty on pedigree stock to five per cent. it was still felt that it would tend to adversely affect the British pedigree live-stock export trade which, as matters stood, was not in a too flourishing state. The Shorthorn Society of Great Britain have now received intimation that the Argentine Government have decided to abolish the tax. This will be cheery news for both breeders and exporters, as the Argentine, amongst all foreign or colonial countries, is Britain's best customer for pedigree live-stock. Despite the fact that the Argentine is now going in more heavily for wheat production than cattle raising, they are still dependent to a considerable extent upon this country for fresh breeding stock for the maintenance of their great ranching activities, and it may just be possible that the announcement now made that the duty on live-stock imports has been withdrawn points to an increasing need for more imports from this country. British pedigree stock-breeders, at any rate, will hope that there is such an underlying necessity and that they will profit accordingly."

Correspondence.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Gland Grafting of Animals.

To the Editor of The Veterinary Record.

Sir,—As one of the first to perform the operation of gland implantation upon animals in this country (my first case was in 1919) I was very interested in the paper read by Mr. G. P. Male at the recent meeting of the Central Division, and reported in your issue of May 2nd.

As regards ovarian gland implantation in cows, I have only performed this in two cases, but both proved successful.

The cases of thoroughbred brood mares which Mr. Male quotes in his paper, are extremely interesting, but it is rather a pity that he did not give more details of the condition of these two mares, as it would have been of value if he had stated the degree of ovarian deficiency which he found in them; also, how many mares has he treated in all, and what proportion of success has he had.

I am sorry to disagree with Major Brayley Reynolds' statement that primary disease of the ovaries is very rare, as, in my experience, ovarian deficiency is the cause of sterility in about 20 pere cent. of cases. Whilst I agree that a good proportion of the sterility met with in practice is due to metritis, I am of the opinion that, in many cases, the metritis is the direct result of ovarian insufficiency, operating through the sub-involution which is produced; so that, to treat the metritis and ignore the cause, namely, the interstitial insufficiency, is to court failure. Moreover, it is a fact that mares will not show any signs of metritis until they have been barren two, three or more years, which rather discounts the retention of placental fragments as a causative factor.

Major Reynolds also refers to the meeting of the Thoroughbred Breeders' Association, at which this question of gland implantation was raised, and quoted the statement which he made then, that " . . . the operation was one which should be debarred . . . hormones, internal secretions, of the graft passed into the blood stream . . . how could one say that some hereditary trait might not also pass ? . . . " If the foregoing be true, then it is also true that the same result would accrue in the case of any glandular extract given by hypodermic or intra-muscular injection, as these also are hormones which are circulating in the blood stream, and so their administration should be debarred, at least in the thoroughbred.

As regards " massage of the ovaries," so-called—many cases of sterility in brood mares are undoubtedly due to delayed ovulation; that is, ovulation does not take place until some varying time after the last service of the mare. Thus, when the ovum eventually reaches the site where fertilisation usually takes place, the spermatozoa are either dead or so weakened that impregnation of the ovum is impossible. In such cases, " massage of the ovaries " is the logical procedure to adopt.

I would also like to amend the statement made by Major Glyn Lloyd anent thyroid " grafting." The type of operation which I advocate in certain cases of wind infirmity is not thyroid but parathyroid implantation. Thyroid grafting is done solely for its effect on metabolism. It is possible that the beneficial effects of testicular or ovarian grafts on general condition are to be explained by their stimulation of the thyroid.

In conclusion, I would like to quote my results of ovarian gland implantation during the past four years. All cases are in thoroughbred mares, and each had been barren at least three years. In all, 25 mares were operated upon, and 17 proved in foal.

Yours faithfully,

J. B. Walker.

High Street,
Slough, Bucks.
May 6th, 1931.

The Editor acknowledges the receipt of the following :—

Report of the proceedings of the Third Annual General Meeting of the Far Eastern Veterinary Medical Association, from Mr. K. D. Turner, Hon. Secretary.

Communications from Mr. F. C. Heathcote (Bridgnorth), Major H. Kirk (London), Mr. W. Lothian (Duns), and Lieut.-Colonel T. D. Young (London).

Diseases of Animals Acts, 1894 to 1927.

SUMMARY OF RETURNS.

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic Mange.§		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks reported by the Local Authorities.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 16 to 30 April, 1931	38	40	—	—	5	8	15	97	57
Corresponding period in—									
1930 ...	24	28	—	—	8	12	3	117	48
1929 ...	26	28	—	—	7	17	13	87	53
1928 ...	35	40	1	31	10	17	15	65	39
Total 1 Jan. to 30 April, 1931	208	222	5	515	69	118	157	524	210
Corresponding period in—									
1930 ...	170	181	—	—	118	181	234	884	349
1929 ...	168	189	20	1,804	120	240	290	478	218
1928 ...	237	264	91	7,604	161	353	267	555	262

Note.—The figures for the current year are approximate only.

§ Excluding outbreaks in Army Horses.